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PARIS

The Arc de Triomphe de l'Etoile, begun by Napoleon I in 1806. This view is made looking through Avenue Kleber toward Avenue Wagram. At right angles to this thoroughfare through the arch are, on the right, the Champs d'Elysées, and on the left the Avenue de la Grande Armée.

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PARIS

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A LOOSE-LEAF AND SELF-REVISING
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IN TEN VOLUMES WITH 515 ILLUSTRATIONS
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VOLUME FOUR

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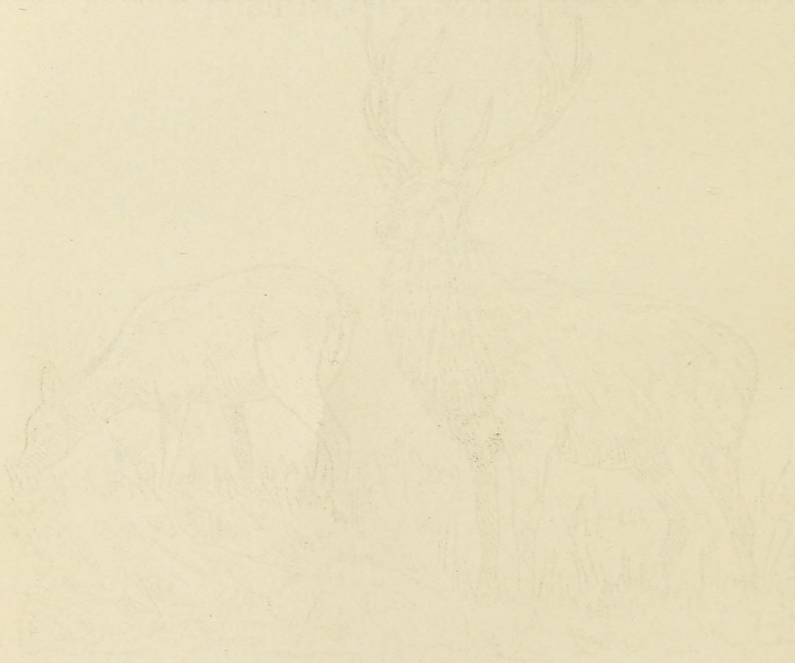
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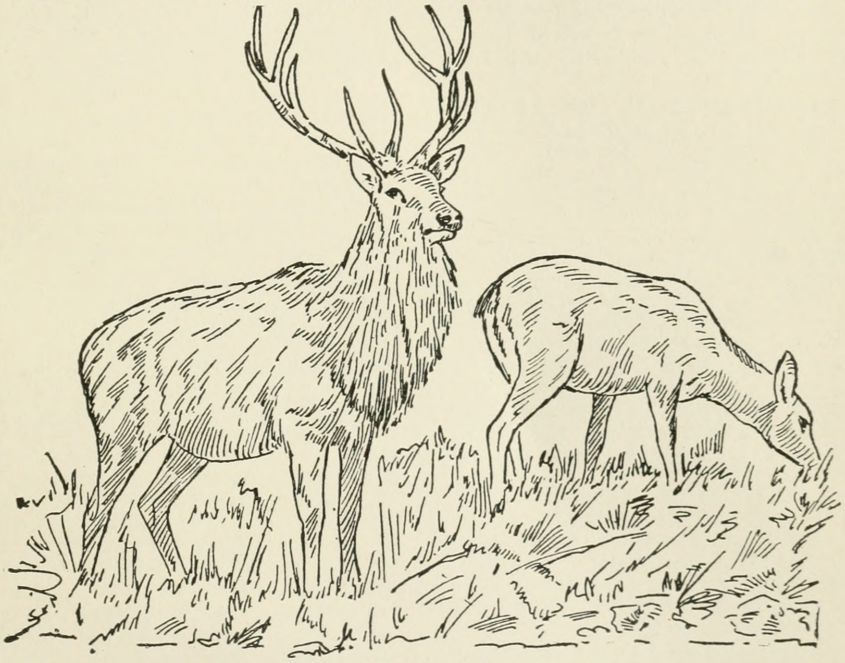
"ELKINS—HERPES"



ELKINS, a city of West Virginia, the county-seat of Randolph co. It is on the Western Maryland and the Coal and Coke railroads. The chief industries are tanning, locomotive and car repairing, and the manufacture of boxes and extracts. The city is the seat of Davis and Elkins College, and has an Odd Fellows' home, hospitals, and other public institutions. Pop. (1910) 5,260; (1920) 6,788.

ELKINS, STEPHEN BENTON, an American capitalist and public official, born in Perry co., O., in 1841. He graduated from the University of Missouri in 1860 and after studying law was admitted to the bar in 1864. In the same year he removed to New Mexico and was elected to the Territorial Legislature. He became in succession district attorney, Attorney-General of the Territory and United States District Attorney. He was a delegate to Congress from New Mexico from 1873 to 1877. He later removed to West Virginia and married the daughter of Henry Gassaway Davis, thus acquiring large business interests, particularly in the coal business and railways. From 1891 to 1893 he was Secretary of War in President Harrison's cabinet, and in 1894 he was elected to the Senate. He was twice re-elected. He was the author of Elkins' Railway Law of 1903. He died in 1911.

ELK, MOOSE, or MOOSE DEER, the largest of the deer family, a native of northern Europe, Asia, and America. The American form (to which the name moose is usually given), is sometimes separated from the European, but most naturalists find no specific difference between them. The elk or moose has a short, compact body, standing about 6 feet in height at the shoulders, a thick neck, large, clumsy head, and horns which flatten out almost from the base into a broad, palmate form with numerous snags. In color the elk is grayish brown, the limbs, sides of head, and coarse mane being, however, of a lighter hue. The moose has a wide range in Canada, extending from the Arctic Ocean, and British Columbia, to New Brunswick and Nova Scotia; it is found also in Maine. It feeds largely on the shoots of trees or shrubs. In Sweden its destruction is illegal, and in Norway there are many restrictions.



AMERICAN ELK

ELKS, BENEVOLENT AND PROTECTIVE ORDER OF, a fraternal society organized in New York, 1868, by members of the Jolly Corks theatrical club. The Grand Lodge was incorporated in 1871, the first members being the past officers of N. Y. Lodge No. 1. Lodges were formed successively in Philadelphia, San Francisco, Chicago, Cincinnati, Sacramento, Baltimore, Louisville,

St. Louis and other cities. The number of lodges has now grown to between 1,200 and 1,400, and they are found in places as distant as Honolulu and Alaska. The order, in addition to the help given its members, has liberally contributed to outside causes, with over $3,000,000 having been so donated. Citizens over 21 are eligible and lodges are confined to cities with a population of at least 5,000. The property and cash of the order amount to over $11,000,000, its membership is nearly 500,000, and its annual disbursement close to $600,000.

ELL, a measure originally taken in some vague way from the arm, and which has been used to denote very different lengths. The English ell, as a measure of cloth, is equal to 1¼ yard, the Flemish ¾ yard, and the French to 1½ yard.

ELLENBOROUGH, EDWARD LAW, 1st EARL OF, son of Lord Chief-Justice Ellenborough; born in 1790. He was educated at Eton and Cambridge, and in 1818, having succeeded his father as second baron, he entered the House of Lords. He took office in 1828 as lord privy-seal, and became president of the board of control in 1828-1830, and again in 1834. In 1841 he accepted the governor-generalship of India, and arrived in Calcutta in 1842, in time to bring the Afghan war to a successful issue; but he was recalled early in 1844. On his return, however, he was defended by Wellington, and received the thanks of Parliament, an earldom, and the Grand Cross of the Bath. He then held the post of first lord of the admiralty (1845-1846), and was president of the board of control from February to June, 1858. His dispatch censuring the policy of Lord Canning as governor-general of India led to his resignation, and he never resumed office. He died in 1871.

ELLESMERE LAND, the southern body of land W. of north Greenland, and N. of Jones Sound, forming the extreme N. extension of the Arctic archipelago of North America. It has no inhabitants and is a region of perpetual ice. Baffin noted it early in the 17th century, but Otto Sverdrup's explorations (1898-1902) have added most to our knowledge.

ELLICE ISLANDS, a group in the Pacific, discovered in 1819, situated in lat. 8° 30′ S., and lon. 179° 13′ E. They form, with the Marshall and the Gilbert group, a continuation of the Carolines, and these three archipelagoes, in fact, have sometimes been called the Eastern Carolines. Their discovery, their settlement, and their history, however, all show that they should be considered distinct from the Carolines, the Gilberts, or the Pelews. In 1892 they were annexed by Great Britain, though they are of no great strategic importance.

ELLIOTT, HOWARD, an American railway president, born in New York in 1860. He was educated at Cambridge High School and the Lawrence Scientific School. After serving in various capacities for several railroads in the West, he became general manager of the Chicago, Burlington and Kansas City, and other roads in 1896, serving until 1902. He was in succession 2d vice-president of the Chicago, Burlington and Quincy; president of the Northern Pacific; and president of the New York, New Haven and Hartford railroads. He served in the latter capacity until 1917, when he resigned to become chairman of the board of directors of the New Haven system. He was president of the Northern Pacific railway until 1920, and was chairman of the board of directors of that railroad from that date. He was a member of many engineering societies. During the World War he acted as a member of the special committee on national defense of the American Railway Association.

ELLIOTT, JOHN, an American artist, born in England in 1858. He was privately educated and studied art in Paris. His art work was chiefly portraits and mural decorations. Among the latter were ceiling decorations in the Boston Public Library, and a mural painting in the National Museum of Washington. In 1908 he served with the American Red Cross in the relief of the sufferers of the Messina earthquake, and was architect of the American village constructed for the sufferers of that catastrophe. He received decorations from the Italian and Spanish Governments.

ELLIOTT, MAUD HOWE, an American writer, the daughter of Julia Ward Howe, born in Boston in 1854. She was privately educated in America and Europe. In 1887 she married John Elliott. She wrote many books, including: "Roma Beata" (1904); "Two in Italy" (1905); "Sun and Shadow in Spain" (1908); "Life and Letters of Julia Ward Howe" (1915). In 1917 she was awarded the Joseph Pulitzer prize for the best American biography teaching patriotism. During the World War she was a member of the executive committee of the N. E. Italian War Relief Fund, and was also a member of the Rhode Island Food Conservation Commission.

ELLIOTT, MAXINE, an American actress. Her real name was Jessie Dermot. She was born in Rockland, Me., in 1873. She made her first appearance on

the stage with E. S. Willard in 1890, and afterward played as leading woman in Shakespearean and other plays. In 1898 she married Nathaniel C. Goodwin, but later secured a divorce from him. From 1908 she was owner and manager of the Maxine Elliott Theater in New York City. She appeared as star in many successful plays, including "When We Were Twenty-One," "Her Own Way," "Under the Greenwood Tree," "The Chaperon," and "Deborah of Tods."

ELLIPSIS, a term used in grammar and rhetoric, to signify the omission of a word necessary to complete the expression or sentence in its usual form. The object of ellipsis is shortness and impressiveness; accordingly, it prevails in proverbs. Ellipses are used in all languages, but the same form of ellipses are not common to all.

ELLSWORTH, EPHRAIM ELMER, an American military officer; born in Mechanicsville, N. Y., April 23, 1837. He removed to Chicago before he was of age, and studied law. He organized about 1859 a zouave corps which became noted for the excellence of its discipline. In March, 1861, he accompanied President Lincoln to Washington, and in April he went to New York City, where he organized a zouave regiment of firemen, of which he became colonel. Ordered to Alexandria, he lowered a Confederate flag floating over a hotel, for which act the hotelkeeper shot him dead, May 24, 1861.

ELM, a genus of trees, consisting of 13 species, all natives of the N. temperate zone. Two species are common in Great Britain (*U. campestris* and *U. montānā*), with many varieties. The *U. campestris*, or common elm, is a fine tree, of rapid and erect growth, and yielding a tall stem, remarkable for the uniformity of its diameter throughout. The average height of a mature tree is 70 or 80 feet, but some reach 150 feet. The wood is brown, hard, of fine grain, and not apt to crack. The tree generally attains maturity in 70 or 80 years. *U. montāna* (the mountain or wych elm), a native of Scotland, grows to a less height than the English elm, is of slower growth, and yields a much shorter bole, but it is far bolder in its ramification and more hardy. It usually attains to the height of about 50 feet. The timber is strong and elastic, and the tree often yields large protuberances of gnarled wood, finely knotted and veined, and much esteemed for veneering. *U. glabra*, the smooth-leaved elm, is a species common in some parts of Great Britain. The most ornamental tree of the genus is *U. pendula*, the weeping elm. The American or white elm (*U. americana*) is abundant in the Western States, attaining its loftiest stature between lat. 42° and 46°; here it reaches the height of 100 feet, with a trunk 4 or 5 feet in diameter, rising sometimes 60 or 70 feet before it separates into a few primary limbs. The red or slippery elm (*U. fulva*) is found over a great extent of country in Canada, Missouri, and as far S. as lat. 31°; it attains the height of 50 or 60 feet, with a trunk 15 or 20 inches in diameter; the wood is of better quality than that of the white elm. The leaves and bark yield an abundant mucilage. The wahoo (*U. alata*), inhabiting from lat. 37° to Florida, Louisiana, and Arkansas, is a small tree, 30 feet high.

ELMAN, MISCHA, a violinist, born at Stalnoje, Russia, in 1891. He played violin in public at the age of five. He studied with Fidelmann, at Odessa, five years and accepted the invitation of Professor Auer, of St. Petersburg, to study with him in 1902. In 1904, when he was 13, he was looked upon as an artist of great promise in St. Petersburg. He then began to make a tour of the capitals of Europe, and finally crossed to the United States. He made his début in New York with the Russian Symphony Orchestra, in 1908, and from that year has toured America a great many times, always receiving much applause. He has also shown talent as a composer and has a number of songs and violin pieces to his credit.

ELMINA (el-mē'nä), a British settlement and fortified seaport on the Gold Coast, a few miles W. of Cape Coast Castle. It was first settled by merchants of Dieppe, came into the hands of the Portuguese in 1471, of the Dutch in 1637, and in 1872 was ceded to the British, who destroyed the native town during the Ashanti war. Pop. about 4,000.

ELMIRA, a city and county-seat of Chemung co., N. Y., on both sides of the Chemung river, and on the Lackawanna, the Lehigh Valley, the Northern Central, and the Erie railroads, and the Chemung canal; 46 miles S. W. of Ithaca. It is the largest city in that part of the State; is beautifully laid out; has a fine water supply; is lighted by gas and electricity; and besides its river and railroad facilities has a valuable commercial outlet in the Chemung canal, which connects it with Seneca lake. The chief industries are the large shops of the Erie and the Northern Central railroads, rolling-mills and blast furnace, boot and shoe factories, iron foundries, the manufacturing and repairing shops of the Pullman Car Company, woolen mills, a steam fire en-

gine manufactory, tanneries, flour mills, and carriage factories. The proximity of the iron and coal fields of Pennsylvania to Elmira, with its numerous facilities for manufactures, gives the city a prominent position among the industrial centers of the country. There are large coal mines 20 miles S. of Elmira, and the Blossburg soft coal field about the same distance S. W. Just beyond the city limits are several quarries of excellent stone. Elmira is the seat of the State Reformatory, Elmira College, Elmira Industrial School, the Arnot-Ogden Hospital, and Elmira Free Academy. It has a public high school, the Steele Memorial Library, several parks, electric lights and street railways, daily, weekly, monthly, and quarterly periodicals, 2 National and several savings banks. Pop. (1910) 37,176; (1920) 45,305.

ELMIRA COLLEGE, an educational institution in Elmira, N. Y., for women; founded in 1855 under the auspices of the Presbyterian Church; reported at the close of 1919: Professors and instructors, 32; students, 323; president, Frederick Lent, Ph. D.

ELMO, or **ERMO**, a corrupted Italianized form of Erasmus, Bishop of Formiæ, a town of ancient Italy, who suffered martyrdom under Diocletian, in A. D. 303. He is invoked by Italian sailors during storms.

ELOCUTION, the art of correct speaking or reading in public, including the appropriate use of gestures. Great attention was paid by the ancients to this art as a branch of oratory. The rhetors in Greece had schools in which young men were trained in the correct use of the voice. Many of the Romans were sent to Greece to study and afterward there were similar teachers of elocution and oratory in Rome. In modern times, the stage has fostered the study of elocution and special attention has been given to it in the Paris Conservatoire, where the strictest canons of the art have been maintained. Many colleges have established professorships of elocution. Perhaps the most successful teacher of this century was Gustave Delsarte, whose theories and practice worked a revolution both in France and other countries. Notable schools of elocution have been established in this country by Charles Wesley Emerson, Franklin H. Sargent, and others. The list of distinguished elocutionists includes the names of Burbank, Frobisher, Riddle, Riley, Powers, and Mackaye.

ELOHIM (e-lō-hēm′), the ordinary name of God in the Hebrew Scriptures. There is the grammatical anomaly that this plural stands as the nominative to a singular verb. This has been held to imply that in the Divine nature there is a certain plurality and a certain unity. The plural has been called also the plural of majesty. It is generally used of the true God, but Jehovah is deemed by far the more sacred name.

ELOI (ā-lwä′), or **ELIGIUS** (ē-ly′jius), **SAINT**, Bishop of Noyon and apostle of Flanders; born in 588. Originally a goldsmith, he became patron of goldsmiths and hammermen. He died in 658.

EL PASO, a city, port of entry, and county-seat of El Paso co., Tex.; on the Rio Grande, and on the Atchison, Topeka and Santa Fé, the Texas and Pacific, El Paso and Southwestern, and the Mexican Central railroads; 712 miles N. W. of Austin. The pass El Paso del Norte, the principal thoroughfare between Mexico and New Mexico through the mountains, is near the city, which is a customs port. It is opposite Ciudad Juarez, the N. terminus of the Mexican Central railroad in Mexico, across the Rio Grande. Among the notable public buildings are the high school, County Court House, and the Federal Building. The State School of Mines is located here. El Paso has 3 National banks, daily and weekly newspapers, ore smelting establishments, and varied manufactures, and carries on an extensive grain trade. It is a noted health resort for victims of lung trouble. Pop. (1910) 39,279; (1920) 77,560.

ELPHINSTONE, WILLIAM, a Scottish prelate, founder of King's College and University, Aberdeen; born in Glasgow, in 1431. He was educated at Glasgow College, and served four years as priest of St. Michael's in that city. He then went to France and became Professor of Law, first at Paris and subsequently at Orleans, but about 1471-1474 he returned home at the request of Muirhead, Bishop of Glasgow, who made him commissary of the diocese. In 1478 he was made commissary of the Lothians, and in 1479 Archdeacon of Argyle. Soon after he was made Bishop of Ross; and in 1483 was transferred to the see of Aberdeen. In 1484 and 1486 he was commissioned to negotiate truces with England, and in 1488 was lord high-chancellor of the kingdom for several months. He was next sent on a mission to Germany, and after his return held the office of lord privy-seal till his death, in 1514.

EL RENO, a city of Oklahoma, the county-seat of Canadian co. It is on the Rock Island, and the St. Louis, El Reno

and Western railroads, and on the Canadian river. Its industries include cotton gins, machine shops, brick plants, and manufactories of brooms, cement stone, washing machines, etc. It has repair shops and division offices of the Rock Island system. Pop. (1910) 7,872 (1920) 7,737.

ELSINORE, a seaport of Denmark on the island of Seeland, at the narrowest part of the Sound (here only 3½ miles broad), 24 miles N. by E. of Copenhagen, and opposite Helsingborg in Sweden. Saxo Grammaticus, a famous writer of the 12th century, was born in Elsinore, and here too Shakespeare lays the scene of "Hamlet." Elsinore was raised to the rank of a town in 1416; it was several times destroyed by the Hanseatic League, and in 1658 was taken by the Swedes, but restored to Denmark two years later. Pop. about 14,000.

ELSSLER, FANNY, a celebrated dancer; born in Vienna, June 23, 1810. She was the daughter of Johann Elssler, Haydn's factotum, and was educated at Naples for the ballet, with her elder sister Theresa, who in 1851 became the wife of Prince Adalbert of Prussia, and was ennobled. Fanny helped to raise money for the Bunker Hill Monument. She died in Vienna, Nov. 27, 1884.

ELSWICK, a township on the W. outskirts of Newcastle, England. Here are located the gun-founding works of the firm of Sir W. G. Armstrong, Mitchell & Co., which are among the largest of the kind in Europe. The frontage toward the river is about one mile, the entire area occupied is about 125 acres, and in busy times about 14,000 work-people are employed. Elswick Park, including Elswick Hall, was opened as a recreation ground in 1878. Pop. about 60,000.

ELVAS (āl'väs), the strongest fortified city of Portugal, in the province of Alemtejo, near the Spanish frontier; 10 miles W. of Badajoz. Standing on a hill, it is defended by seven large bastions and two isolated forts.

ELWOOD, a city of Indiana in Madison co. It is on the Lake Erie and Western, and the Pittsburgh, Cincinnati, Chicago, and St. Louis railroads. There is an important trade in live stock, grain and produce, and the industries include tin-plate mills, iron works, canning factories, plate glass factories, etc. The city has a public library. Pop. (1910) 11,028; (1920) 10,790.

ELY, an episcopal city of England, in the county of Cambridge. The ecclesiastical structures comprise the cathedral and the churches of St. Mary, and the Holy Trinity, the last belonging to the time of Edward II., and one of the most perfect buildings of that age. The superb cathedral occupies the site of a monastery founded about the year 673 by Etheldreda, daughter of the King of East Anglia. Its entire length, E. to W. is 537 feet, and its W. tower is 170 feet high. The whole structure comprises an almost unbroken series of the various styles of architecture which prevailed in England from the Conquest to the Reformation, yet with no loss of impressiveness as a whole. It has undergone of late years extensive additions and restoration. Most of the inhabitants are engaged in agricultural labor. Pop. 8,000.

ELY, RICHARD THEODORE, an American educator; born in Ripley, N. Y., April 13, 1854; was graduated at Columbia University in 1876; appointed head of the department of Political Economy at Johns Hopkins (1881-1892); and professor of Political Economy at University of Wisconsin since 1892. His publications include "French and German Socialism in Modern Times" (1883); "The Past and Present of Political Economy" (1884); "The Labor Movement in America" (1886); "Problems of Today" (1888); "Political Economy" (1889); "Social Aspects of Christianity" (1889); "Studies in the Evolution of Industrial Society" (1903); "Property and Contract" (1914). He edited Macmillan's "Citizens' Library of Economics" and several sociologieal text-books.

ELYRIA, a city of Ohio, the county-seat of Lorain co. It is on the Lake Shore and Michigan Southern, and the Baltimore and Ohio railroads, and on the Black river. There are important manufactures of automobiles, telephones, flour, canned goods, concrete blocks, iron pipe, steel, etc. The public buildings include a library and a hospital. There is also a fine natural park. Pop. (1910) 14,825; (1920) 20,474.

EMANCIPATION, the act by which in the Roman law, the paternal authority was dissolved in the lifetime of the father. It took place in the form of a sale by the father of the son to a third party, who manumitted him. The Twelve Tables required that this ceremony should be gone through three times, and it was only after the third sale that the son came under his own law. In general, the son was at last resold to the father, who manumitted him, and thus acquired the rights of a patron which would otherwise have belonged to the alien purchaser who finally manumitted him. In the case of daughters and grandchildren one sale was sufficient. In the law of

Scotland, emancipation is called forisfamiliation. The Roman Catholic Emancipation Act was the act, signed April 13, 1829, which removed the most galling of the Roman Catholic disabilities in England.

EMANCIPATION PROCLAMATION, a proclamation providing for the emancipation of the slaves in certain parts of the Confederate States, issued as a war measure by President Lincoln, Jan. 1, 1863. The number of slaves emancipated by this proclamation was, taking the census of 1860 as a basis, as follows:

Alabama	435,080
Arkansas	111,115
Florida	61,745
Georgia	462,198
Louisiana	247,715
Mississippi	436,631
North Carolina	331,059
South Carolina	402,046
Texas	182,566
Virginia	450,000
Total	3,120,155

The number of slaves not affected by its provisions was about 832,000. The full text of the proclamation is as follows:

"Whereas, on the twenty-second day of September, one thousand eight hundred and sixty-two, a proclamation was issued by the President of the United States, containing, among other things, the following to wit:

That, on the first day of January, in the year of our Lord one thousand eight hundred and sixty-three, all persons held as slaves within any State, or designated part of State, the people whereof shall be in rebellion against the United States, shall be then, thenceforth and forever free, and the Executive Government of the United States, including the military and naval officers thereof, will recognize and maintain the freedom of such persons, and will do no act or acts to repress such persons, or any of them, in any efforts they may make for their actual freedom.

That the Executive will, on the first day of January aforesaid, by proclamation, designate the States and parts of States, if any, in which the people thereof shall be in rebellion against the United States, and the fact that any State, or the people thereof, shall, on that day, be, in good faith, represented in the Congress of the United States by members chosen thereto at elections wherein a majority of the qualified voters of such State shall have participated, shall, in the absence of strong countervailing testimony be deemed conclusive evidence that such State and the people thereof are not then in rebellion against the United States.

Now, therefore, I, Abraham Lincoln, President of the United States, by virtue of the power in me vested as Commander-in-chief of the Army and Navy of the United States in time of actual armed rebellion against the authority and Government of the United States, and as a fit and necessary war measure for suppressing said rebellion, do, on this first day of January, in the year of our Lord one thousand eight hundred and sixty-three, and in accordance with my purpose so to do, publicly proclaim for the full period of one hundred days from the day of the first above-mentioned order, and designate, as the States and parts of States wherein the people thereof respectively are this day in rebellion against the United States, the following, to wit: Arkansas, Texas, Louisiana (except the parishes of St. Bernard, Plaquemines, Jefferson, St. John, St. Charles, St. James, Ascension, Assumption, Terre Bonne, Lafourche, St. Mary, St. Martin, and Orleans, including the city of New Orleans), Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, and Virginia (except the forty-eight counties designated as West Virginia, and also the counties of Berkeley, Accomac, Northampton, Elizabeth City, York, Princess Ann, and Norfolk, including the cities of Norfolk and Portsmouth), and which excepted parts are, for the present, left precisely as if this proclamation were not issued.

And by virtue of the power and for the purpose aforesaid, I do order and declare that all persons held as slaves within said designated States and parts of States are, and henceforward shall be, free; and that the Executive Government of the United States, including the military and naval authorities thereof, will recognize and maintain the freedom of said persons.

And I hereby enjoin upon the people so declared to be free to abstain from all violence, unless in necessary self-defense, and I recommend to them that, in all cases, when allowed, they labor faithfully for reasonable wages.

And I further declare and make known, that such persons, of suitable conditions, will be received into the armed service of the United States, to garrison forts, positions, stations, and other places, and to man vessels of all sorts in said service.

And upon this act, sincerely believed to be an act of justice, warranted by the Constitution, upon military necessity, I invoke the considerate judgment of mankind and the gracious favor of Almighty God.

In testimony whereof, I have hereunto set my name, and caused the seal of the United States to be affixed.

[L. S.] Done at the city of Washington, this first day of January, in the year of our Lord, one thousand eight hundred and sixty-three, and of the Independence of the United States the eighty-seventh.

By the President ABRAHAM LINCOLN.
WILLIAM H. SEWARD,
Secretary of State.

EMANUEL THE GREAT, King of Portugal; born May 3, 1469. He succeeded his cousin John II. in 1495; and aided the expeditions of Vasco da Gama, Cabral, Cortereal, and Albuquerque. He died in Lisbon, Dec. 13, 1521.

EMBARGO ACT, an act passed by the American Congress, Dec. 22, 1807, prohibiting exportations from the United States. The act was a measure of retaliation against England and France for their interference with American commerce in 1806-1807, and aimed at forcing them to recede from their position by showing the importance of our commercial relations. It had some effect on these nations, but a far more ruinous result on our own commerce. It was a measure of the Democratic party, and was approved by the agricultural portions of the United States. The New England States, deeply interested in foreign commerce, and the Federalists loudly condemned it. Its opponents, spelling the name backward, called it the "O grab me" Act, and threats of secession were heard from New England. As a result, Congress fixed March 4, 1809, for the termination of the embargo. The first embargo in our history was laid in 1794 for a period of 60 days, and other minor

acts of a similar nature were passed during the War of 1812. The plan of limiting commercial intercourse by embargo, non-importation and non-intercourse acts was called the "restrictive system." In the course of the World War (1914-1918) attempts were made by pro-Germans, pacifists, and well-meaning humanitarians to place an embargo on the shipment of arms to Entente nations, but the attempt failed.

EMBER DAYS, certain days set apart for prayer and fasting, one special theme of supplication being that the blessing of God may descend on the crops, and consequently that there may be plenty in the land. Stated days of this character began to be observed in the 3d century, but at first there was no unity over the Christian world as to the precise days. In A. D. 1095 the Council of Placentia diffused them over the year.

EMBROIDERY, the art of producing ornamentation by means of needlework on textile fabrics, leather and other materials. Embroidery is closely allied to lace-work, which is the direct development of the cut, drawn, and embroidered linen of the classic and early Christian periods. Embroidery pure and simple does not admit of appliqué, which, in conjunction with embroidery, forms a separate art in itself; nor should it be confused with tapestry work, which is to weaving what lace-work is to embroidery. Embroidery has had many schools and styles, but it may be classed under six general heads:

1. *Linen embroidery*, embracing all work done on linen or cotton in threads of the same color as the textile, and where the ornamentation is dependent wholly on the fineness of the needlework and the form of the design for its beauty. This work includes cut work and drawn work, to the point where netlike interweaving of the embroidery threads becomes lace.

2. *Linen embroidery in color.*—Linen and cottons are embroidered in colors with either silk, cotton, or wool. This work includes most of the Oriental work, where the colored design produces the ornament, and fine needlework and for more secondary considerations to the disposition of color. This work in fine wool reaches its highest excellence in the India shawls, which are the nearest bond between embroidery and weaving.

3. *Gold and silver embroidery*, in which threads and spangles are sometimes used in addition to the metal threads. The Italians and Spanish of the 16th century, and the Orientals (notably the Japanese), have done much in this class of work.

4. *Silk, gold and wool.*—This style reached its highest excellence in the ecclesiastical embroideries of Europe in the 15th and 16th centuries.

5. *Silk and wool embroidery* on coarse canvas, where the foundation textile is entirely hidden by the regular interwoven stitches. This work often so nearly resembles certain tapestries as to cause confusion in distinguishing them.

6. *Modern imitations* in coarse materials of the fine work of the past, and the development of those imitations known variously as crewel work, tapestry work, etc.

EMBRYO, an unborn young animal, or the rudimentary young plant, especially when within the seed. The term fœtus is equivalent to embryo, but is restricted to mammalian development. The term larva is also applied to a young animal which is more or less markedly different from the adult form.

EMBRYOLOGY, that department of biology which traces the development of the individual organism before birth. It gives the history of the organism from its earliest individual appearance till it is born or hatched, properly including all the anatomical and physiological changes that take place in the embryo, whether in the uterus or the egg. The investigation necessarily takes two forms; a description of the successive structural stages, and an analysis of the vital processes associated with each step. The development of the chick was watched in Greece 2,000 years ago by Aristotle and Galen; and in 1651 Harvey sought to establish two main propositions: (1) that every animal was produced from an ovum, and (2) that the organs arose by new formation (epigenesis), not from the expansion of some invisible preformation. But as a systematic science embryology dates from the 19th century. Wolff in 1759 reasserted Harvey's epigenesis, and showed that the germ consisted of almost structureless material, and that the process of development was a gradual organization. In 1817 Pander took up Wolff's work virtually where he left it. He was immediately re-enforced and soon left behind by Von Baer, whose investigations laid a firm foundation for modern embryology. Since the establishment of the cell-theory in 1838-1839, and the now well-known facts that the organism starts from a fusion of two sex-cells, and that development consists in the division of the fertilized ovum and differentiation of the results, progress has been rapid.

EMERALD, a variety of beryl, distinguished from the latter by being emerald-green in place of pale green,

light blue, yellow or white, the colors of the beryl. The finest emeralds are found in Peru, but they occur in various other places. In heraldry, the term designates the green tincture in coat-armor; vert.

EMERALD ISLE, an epithet applied to Ireland, from the freshness and bright color of the verdure, produced by the abundant heat and moisture continually reaching it from the Atlantic. This epithet was first used by Dr. W. Drennan (1754-1820), in his poem entitled "Erin."

EMERALD MOTH, the name given to the genus *Hipparchus;* the large emerald moth is the *Hipparchus papilionarius*. The wings are 2 or 2½ inches across their surface, grass-green, with two rows of whitish spots, and a greenish-yellow fringe. Its antennæ are reddish-brown. The caterpillar feeds on the leaves of the elm, the alder, the beech, the lime, etc. The moth is principally found in England and in southern Scotland.

EMERITUS (ē-mer'i-tus), a name given to Roman soldiers who had fulfilled the legal term of military service. It is now applied in colleges and universities to professors who, after meritorious services, are honorably discharged on account of age, etc.

EMERSON, RALPH WALDO, an American essayist, poet, and philosopher, born in Boston, May 25, 1803. Seven generations of his ancestors had been clergymen; he inherited a tradition of scholarship and heroic living, and was himself trained to continue the tradition. He knew few pleasures in boyhood; he was quiet and studious, though not brilliant; he worked his way through Harvard. In 1829 he was ordained minister of the Second Church of Boston, married, and settled down, apparently, to the life of his ancestors. After three years, however, he resigned, being unable to follow the forms and ceremonies of the church. He spent a time in Europe, where he was more interested in personalities than in the sort of thing usually looked for by tourists. He met Carlyle, then unknown, who exerted a profound influence upon him. He brought out Carlyle's books in America, where they had a greater sale than in England, and a lifelong correspondence was carried on by the two friends.

In 1835 he returned to Concord, to the Old Manse, where he studied and wrote. For the anniversary of Lexington, April 19, 1836, he composed the hymn which has become famous. He did a little lecturing, was interested in gardening, bought several tracts of land, studied Nature rather than books. At length he published (1836) his first important book, a slender volume entitled "Nature," which, with his oration on the American Scholar (1837) and an address delivered at Dartmouth in 1838, forms an introduction to his philosophy. In the first of these he urged the divinity of the soul and its capacity to attain all knowledge; the conception of Nature as a gigantic shadow of God, able to unlock powers of the soul either as energy or as knowledge; and the idea that God, by these means, teaches the soul directly. Thus each man may build his own world, casting aside external authority and all tradition. In the Harvard address on the American Scholar he puts Nature as first of the influences on the scholar's



RALPH WALDO EMERSON

development; the second influence is the mind of the past, able to inspire and to call forth latent powers, though not to dominate the active soul; the third is action, since the idea that scholarship means seclusion from the world is wrong. The scholar must guide men by showing them realities underneath appearances; he must be free and brave; so shall he help to make a nation of men. The Dartmouth College address supplements these ideas, especially the belief that the chief duty of the educated man is to project his own soul into the universe—the past, the realm of external nature, the realm

of active life—and so realize his own divine personality.

With the publication of the first series of "Essays," 1841, Emerson's leading ideas were almost completely stated. "Self-Reliance" is a development of what had already had briefer statement, especially in the Harvard address. The theme is the direct relation between man and divinity, cutting away dependence upon party, creed, travel, books, worldly ideas of success. In "The Oversoul" we have an amplification of a paragraph in "Self-Reliance," of which the kernel is to the effect that "we lie in the lap of immense intelligence, which makes us organs of its activity and receivers of its truth." The doctrine is Platonic, and is developed on Platonic lines. We live only partially; at times of inspiration the soul of the whole comes to life in us, the wise silence, the universal beauty. This universal beauty belongs to the ages; spirit may incarnate itself at any time. Other essays, such as "Circles," "Spiritual Laws," and the like, contain a similar message, always phrased so suggestively as to seem to be said for the first time. Essays on political relations, such as "History," "Politics," "Experience," teach that all the past, as well as all that Nature gives, meet in the Now of the Soul. Personality is thus the concentration of experience in moments of illumination. Because of his emphasis on personality he seems to neglect the state, or the conception of organized society. He is not sympathetic toward reform; a law is but a memorandum; not riches or territories, but men form the highest end of government; there is danger in "undertaking for another;" only man and the world spirit remain, and their union is the sole value in life.

These ideas, and others related to them, were developed in a series of essays unique for their inspiring idealism. The second series of essays appeared in 1844, followed in 1847 by a volume of poems. His poetry, like his prose, is distinguished for its compactness, its oracular quality, and for its beauty. Many of the poems are miniatures of the essays, and may be attached to them. His chief source of inspiration is Nature, though he also wrote a series of patriotic and anniversary poems that have become justly famous. A volume entitled "Nature, Addresses, and Lectures" appeared in 1849, and another collection of lectures, "Representative Men," in 1850. He published "English Traits" in 1856; "The Conduct of Life" in 1860. Other collected works, such as "The Natural History of Intellect," the "Journals," and the correspondence with Carlyle, appeared after his death, which took place on April 27, 1882.

EMERY, HENRY CROSBY, an American economist, born at Ellsworth, Me., in 1872. He graduated from Bowdoin College in 1892 and took post-graduate courses at Columbia and the University of Berlin. He was instructor and professor of political economy at Bowdoin from 1894 to 1900, and from 1900 to 1915 was Professor of Political Economy at Yale. From 1909 to 1913 he was chairman of the United States Tariff Board. He was foreign representative of the Guaranty Trust Company of New York from 1916. During the World War he was arrested while traveling in Russia and for some time held prisoner. He wrote "Speculation on the Stock and Produce Exchanges of the United States" (1896); "Politician, Party, and People" (1913). He also contributed many articles on economic and political questions to various magazines.

EMEU. See EMU.

EMIGRATION. See IMMIGRATION.

EMILIA, a compartimento of central Italy, comprising the provinces of Bologna, Ferrara, Forli, Modena, Parma, Piacenza, Ravenna and Reggio Emilia. The name is derived from the ancient Via Æmilia (a continuation of the Via Flaminia) which passed through these territories.

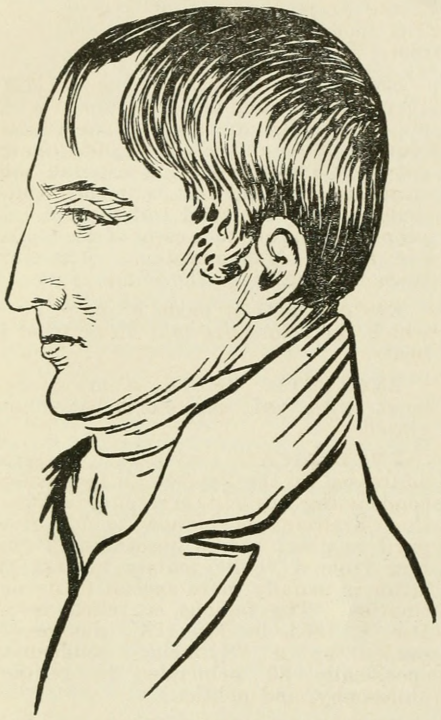
EMINENT DOMAIN, the power to take private property for public use. It is well settled that such power exists only in cases where the public exigency demands its exercise.

EMIN PASHA. See SCHNITZER, EDWARD.

EMIR, or **AMIR**, a sovereign, a prince. The title was instituted in A. D. 650 by Fatima, the daughter of Mohammed, and was applied to the descendants of the "Prophet." They alone were permitted to wear the green turban. In the forms, amir and ameer, it is known in English-speaking countries chiefly in connection with the Ameers of Scinde vanquished by Sir Charles Napier at the battle of Meanee, Feb. 17, 1843, their territory being subsequently annexed to the Anglo-Indian empire.

EMMET, ROBERT, an Irish patriot; born in Dublin, in 1778. He was expelled from Trinity College, Dublin, in 1798, on the ground of exciting disaffection and rebellion, and having become an object of suspicion to the government, quitted Ireland. He returned there on the repeal of the suspension of the Habeas Corpus Act, and became a mem-

ber of the Society of United Irishmen for the establishment of the independence of Ireland. In July, 1803, he was the ringleader in the rebellion in which Lord Kilwarden and others perished. He was arrested a few days afterward, tried, and executed. His fate excited



ROBERT EMMET

special interest from his attachment to Miss Sarah Curran, daughter of the celebrated barrister.

EMMICH, GENERAL VON, a German army officer. He was in command of the Tenth Hanoverian Army Corps when the World War broke out, in 1914, but was detached from his command to direct the operations of the troops which began hostilities on the western front by attacking Liège, in Belgium. So heavy were the casualties inflicted by the Belgians on Von Emmich's shock battalions that the German advance was held up for almost a week, giving the French and British forces in France time to prepare a partial defense.

EMPLOYERS' ASSOCIATIONS. With the growth of labor organizations it is only natural that there should have developed associations of similar nature and aims among those to whom the labor unions are opposed, the employers. Employers', or masters', associations, were formed in Great Britain as far back as the beginning of last century, for the purpose of combating the power of the trades unions. For a while both were of the nature of secret organizations, and both sides were equally unscrupulous in the methods they employed in harming each other.

In this country the first employers' association was the Stove Founders' National Defense Association, founded in 1868. In 1913 a Congressional Commission, appointed to investigate the alleged evil influence of manufacturers' combines in procuring legislation favorable to employers, reported the existence of two hundred employers' associations, most of which were frankly arrayed against the labor unions, to combat them by either economic or legislative action. Most important of these, in regard to size, scope of activity and general significance, was the National Association of Manufacturers, founded in Cincinnati, O., in 1895. The openly avowed object of this organization is to increase the volume of export trade, by means of disseminating a knowledge of conditions in foreign countries and their needs in the way of commodities of American manufacture; to oppose "harmful" labor legislation and to exert influence in favor of "beneficial" legislation; and to arbitrate labor disputes. The Association of Manufacturers is a thoroughly "class conscious" organization, and devotes a great deal of energy, both directly and indirectly, in promoting the interests of manufacturers in general and in fighting the demands of the labor unions where they extend to the closed shop, minimum wages and, in some cases, recognition through their national organizations. In the famous litigation brought against the American Federation of Labor for its boycott of the Bucks Stove and Range Co., lasting over a period of many years, the Manufacturers' Association was the backbone of the forces opposed to the labor body. Within more recent years, however, and especially since the close of the World War, it has turned its attention more in the direction of radical labor organizations, and especially against the I. W. W. The movements of the members of this revolutionary order are closely watched, and reported to those members of the Association threatened by encroachment by agitators for the Red doctrine.

EMPLOYERS' LIABILITY, the responsibility of the master for the safety of his workmen which the law implies in certain contracts between capital and labor. In most of the United States this liability is not statutory, but is de-

termined by a suit for damages under the law of negligence. If the employer can show contributory negligence on the part of the workmen, he is exempt from liability in a damage suit. In 1897, 1900, and 1913 laws were passed that insured an employee against injury. Many of the States have compensation laws that apply to public as well as private concerns. Compensation or insurance is provided generally; either law may be elective or compulsory. In England employers' liability is recognized and regulated by act of Parliament in which the element of contributory negligence is largely ignored.

EMPORIA, a city and county-seat of Lyon co., Kan.; on the Neosho and Cottonwood rivers, and on the Atchison, Topeka and Santa Fé, and the Missouri, Kansas and Texas railroads; 60 miles S. W. of Topeka. It is the farming and stock-raising center of the district, and has a Court House, State Normal School, College of Emporia, foundries, woolen and flour mills, canning and carriage factories, gas and electric lights, conservatory of music, daily and weekly newspapers, and 2 National banks. Pop. (1910) 9,053; (1920) 11,273.



EMU

EMU, a large bird, native of Australia. Its color is a dull brown, mottled with dingy gray; the young are striped with black. When assailed it strikes backward and obliquely with its feet, and it is so powerful that a stroke of its foot is said to be sufficient to break a man's leg. Well-trained dogs run in before it and spring at its neck. It cannot fly, but runs very fleetly. The eggs are highly esteemed as food. As much as six or seven quarts of oil have been obtained from the skin of a single bird. The food of the emu consists chiefly of roots, fruit, and herbage.

ENAREA (e-nä'rā-ä), or **LIMMU** (lē'mö), a region of Abyssinia, S. W. of Shoa, with an area of over 1,100 square miles, and about 40,000 inhabitants. It is a land of forest-clad hills, rising beyond 8,000 feet, with their slopes covered with the wild coffee plant. Its people, belonging to a stem of the Gallas, are mostly Mohammedans. The chief town is Saka, near the Gibbe river.

ENCAUSTIC, a mode of painting in which the colors are laid on or fixed by heat.

ENCAUSTIC BRICK, a brick ornament with various colors baked and glazed.

ENCYCLICAL (-sik'li-kal), a letter addressed by the Pope to all his bishops, condemning current errors or advising the Christian people how to act in regard to great public questions. It differs from a "bull" mainly in that the latter is usually more special in its destination. The famous encyclical issued Dec. 8, 1864, by Pius IX., was accompanied by a "Syllabus" condemning specifically 80 principles in religion, philosophy, and politics.

ENCYCLOPÆDIA. See CYCLOPÆDIA.

ENDICOTT, JOHN, a colonial governor of Massachusetts; born in Dorchester, England, in 1589. He landed as manager of the plantation of Naumkeag (Salem) in 1628. Giving place in 1630 to John Winthrop, he headed a sanguinary expedition against the Indians in 1636, was deputy-governor in 1641-1644, 1650, and 1654, and governor in 1644-1649, 1650-1653, and 1655-1665. Endicott was an austere Puritan, choleric, benevolent, and brave. He died in Boston, March 15, 1665.

ENDIVE, a composite plant, a native of Asia; early cultivated in Egypt, used by the Greeks and Romans, and introduced into Great Britain some time before A. D. 1548. It has a head of pale-blue flowers. There are two leading varieties, one with broad, ragged leaves, the other with leaves narrower and curled. The leaves, after being blanched to diminish their bitterness, are used in salads and stews.

ENDOR, a village of Palestine, 4 miles S. of Tabor; a poor mud hamlet. It was the place which Saul visited (I Sam. xxviii : 7), to consult the "woman with a familiar spirit" previous to his fatal engagement with the Philistines.

ENDYMION (-dim'i-on), a shepherd, son of Æthlios and Calyce. It is stated that he asked Jupiter to grant him to be always young, and to sleep as much as he would; whence came the proverb, "to sleep the sleep of Endymion." Diana, or the moon, saw him unclothed as he slept on Mount Latmos, and became enamored of his great beauty, coming down from heaven every night to visit him.

ENEMY, one who is unfriendly or hostile to another; one who hates or dislikes; a hostile army or force; the great adversary of mankind, the devil.

According to ancient military usage, the utmost cruelty was lawful toward enemies. In modern times more humane principles prevail, and men recognize that, by taking up arms against one another in public war, they do not cease on this account to be moral beings, and responsible to one another and to God. Warfare is now carried on subject to certain general rules, which are intended to abridge the calamities of war, and to protect the rights of individuals. An admirable summary of these rules may be found in the "Instructions for United States Armies," issued in 1863. In 1874 an International Conference, held in Brussels, devoted much time to the elaboration of rules for military warfare. The Institute of International Law, at its meeting at Oxford, in 1880, prepared and adopted a "Manual of the Laws of War on Land," in which minute rules for the conduct of hostilities are set forth.

Military necessity admits of all direct destruction of life or limb of armed enemies, and of other persons where destruction is unavoidable; it allows of all destruction of property, and obstruction of the ways and channels of traffic, and of all withholding of sustenance or means of life from the enemy. Such military necessity does not, however, admit of cruelty, nor of maiming or wounding except in fight, nor of the use of poison in any way, nor of the wanton devastation of a district. It admits of deception, but disclaims all acts of perfidy. In the case of the occupation of a country by the enemy, the persons of the inhabitants, especially of women, are respected, and the maxims of religion and morality are acknowledged. Private property, unless forfeited by crimes, can be seized only on the ground of military necessity; if the proprietor has not fled receipts are usually given, which enable the spoliated owner to obtain indemnity. Trade between the subjects of two hostile powers is absolutely suspended during hostilities unless permitted by express sanction, and the importation of articles particularly useful in war is contraband. All such material, whether supplied by subjects of the enemy or of another state, is seized and confiscated. In the World War (1914-1918) the English courts held that an enemy alien residing in England could defend an action brought against him, but an interned enemy subject could not. The Germans allowed an enemy alien residing in the Empire access to the German courts, but not those living in other countries. In France some of the lower courts allowed enemy aliens to take action and some did not. In April, 1916, the French Court of Appeal upheld this right. In the United States alien enemies had access to the courts as freely as citizens.

ENERGETICS, that branch of science which investigates the laws relating to physical or mechanical forces, as opposed to vital. It thus comprehends the consideration of the whole range of physical phenomena.

ENERGY, the power that a body or system possesses of doing work; a term in physics. There is no manifestation of energy apart from matter. There are two main types of energy: Energy of motion (kinetic energy), and energy of position (potential energy). Currents of air or of water possess kinetic energy; a stone resting on the brow of a cliff, and water at the edge of a fall, possess potential energy. There is energy of visible motion and energy of position in visible arrangements of bodies, as in the bullet moving upward or downward, or at rest at its highest position. A bullet projected vertically upward possesses a great amount of energy. The higher it rises the less resistance can it overcome; and having reached the highest it can attain, it seems incapable of doing work, yet it will gradually acquire speed in the downward direction, and will finally (the resistance of the air being neglected) reach the ground with the same speed it had at first, and is thus capable of doing the same amount of work. When at its highest position and seemingly incapable of doing work, it really possesses energy as at first. A bent spring possesses potential energy.

ENFIELD, a town of Connecticut, in Hartford co. It is on the Connecticut river, and on the New York, New Haven and Hartford railroad. Its industries include carpet factories, brick works, and the manufacture of filter presses, under-



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takers' supplies, etc. It is the center of an important tobacco-growing industry. Within the town limits is a settlement of Shakers. There is a public library. Pop. (1910) 9,719; (1920) 11,719.

ENGHIEN (on-gyon'), LOUIS ANTOINE HENRI DE BOURBON, DUKE OF; born in Chantilly, Aug. 2, 1772; son of Louis Henry Joseph Condé, Duke of Bourbon. On the outbreak of the Revolution he quitted France, traveled through various parts of Europe, and went in 1792 to Flanders to join his grandfather, the Prince of Condé, in the campaign against France. From 1796 to 1799 he commanded the vanguard of Condé's army, which was disbanded at the Peace of Lunéville (1801). He then took up residence as a private citizen at Ettenheim, in Baden, where he married the Princess Charlotte de Rohan Rochefort. He was generally looked on as the leader of the French Émigrés. An armed force was sent to seize him in Baden in violation of all territorial rights, and he was brought to Vincennes, March 20, 1804. A mock trial was held the same night; and on the following morning he was shot in the ditch outside the walls.

ENGINEERING, the branch of science dealing with the design, construction and operation of various machines, structures, and engines used in the arts, trades, and everyday life. Engineering is divided into many branches, the most important being civil, mechanical, electrical, mining, military, marine, and sanitary engineering.

Civil Engineering is the most extensive and embraces the arts of architecture, surveying, bridge, railroad, harbor, and canal construction, and the building trades.

Mechanical Engineering comprises the design, construction, and operation of machinery, the design of manufacturing plants, and all branches of industrial production.

Electrical Engineering is a branch of mechanical engineering and includes the application of electricity to mechanical and industrial pursuits, as derived from some other source of energy.

Mining Engineering is a combination of the three preceding branches as applied to the discovery and operation of mines, the building of mineral working plants, and treatment of ores.

Military Engineering deals entirely with the arts of war, the design, construction and maintenance of fortifications, machines of defense and attack, ordnance, and the surveying of country in preparation for military operations.

Marine Engineering is partly military and partly civil, embracing naval architecture, building and operating of ships and naval accessories. In the military sense, it comprises the construction of war vessels and the construction and placing of torpedoes, submarine mines, etc.

Sanitary Engineering consists of the construction of sewers and drains, providing for the cleaning of city streets and the disposal of garbage and sewage, reclaiming of swamps, and overcoming of all sources tending to interfere with public health.

The education and training of the engineer in modern times have called for the establishment of technical schools and courses in engineering in the large colleges and universities. These schools provide the student with the theories of mathematics, mechanics, and engineering, and by means of extensive laboratory and outside work provide him with practice in the design, construction, and use of modern engineering appliances. Among the most noted technical schools are the University of Glasgow, École Polytechnique, in Paris; Stevens Institute of Technology, in Hoboken, N. J.; the Massachusetts Institute of Technology, in Boston; and Cornell and Columbia Universities.

ENGINEERS, ROYAL, a corps in the British army intrusted with the construction of all military works, plans, surveys, etc. In 1772 the first company of "sappers and miners" was organized at Gibraltar. In 1783 the engineers were raised to be a royal corps, and in 1812 several companies of artificers were converted into "sappers and miners." This name was abolished and that of royal engineers substituted in 1857. The corps usually numbers from 5,000 to 6,000 officers and men. The privates, who are generally skilled artisans, receive a much higher rate of pay than ordinary infantry soldiers.

ENGLAND, including WALES, the S. and larger portion of the island of Great Britain, is situated between 50° and 55° 46′ N. lat., and 1° 46′ E. and 5° 42′ W. lon. On the N. it is bounded by Scotland; on all other sides it is washed by the sea; on the E. by the North Sea or German Ocean; on the S. by the English Channel; and on the W. by St. George's Channel and the Irish Sea. Its figure is, roughly speaking, triangular, but with many windings and indentations, the coast-line measuring not less than 2,765 miles. The length of the country, measured on a meridian from Berwick nearly to St. Alban's Head, is 365 miles. Its breadth, measured on a parallel of latitude, attains its maxi-

mum between St. David's Head, in South Wales, and the Naze, in Essex, where it amounts to 280 miles.

Area and Population.—The area of England and Wales is 58,311 square miles and the population (estimated 1919), England, 34,045,290; Wales, 2,025,202; or a total of 36,070,492.

The population of the principal cities in England in 1919 is estimated as follows: London (Greater), 7,258,263; Birmingham, 861,585; Liverpool, 772,665; Manchester, 741,068; Sheffield, 473,695; Leeds, 430,834; Bristol, 361,247; Bradford, 282,714.

Physical Features.—The chief indentations are: On the E., the Humber, the Wash, and the Thames estuary; on the W., the Solway Firth, Morecambe Bay, Cardigan Bay, and the Bristol Channel; those on the S. are less prominent, though including some useful harbors. The greater part of the coast consists of cliffs, in some places clayey, in others rocky, and sometimes jutting out, as at Whitby and Flamborough Head on the E., Beachy Head, the Isle of Portland, the Lizard and Land's End on the S. and S. W., St. David's Head and St. Bees Head on the W., into bold, lofty, and precipitous headlands. The most extensive stretches of flat coast are on the E., in the county of Lincoln, and from the S. part of Suffolk to South Foreland in Kent, and in Sussex and Hants on the S. coast. The chief islands are: Holy Island, the Farne Islands, Sheppy, and Thanet on the E. coast; the Isle of Wight on the S.; the Scilly Isles at the S. W. extremity; and Lundy Island, Anglesey, Holyhead, and Walney on the W.

The loftiest heights of England and Wales are situated at no great distance from its W. shores, and consist of a succession of mountains and hills, stretching, with some interruptions, from N. to S., and throwing out numerous branches on both sides, but particularly to the W., where all the culminating summits are found. The N. portion of this range has received the name of the Pennine chain. It is properly a continuation of the Cheviot Hills, and, commencing at the Scottish border, proceeds S. for about 270 miles, till, in the counties of Derby and Stafford, it assumes the form of an elevated moorland plateau. In Derbyshire The Peak rises to the height of 2,080 feet. By far the most important of its offsets are those of the W., more especially if we include in them the lofty mountain masses in northwestern England sometimes classed separately as the Cumbrian range. Amid these mountains lie the celebrated English lakes, of which the most important are Windermere, Derwent Water, Coniston Lake and Ullswater. Here also is the highest summit of northern England, Scawfell (3,210 feet). The Pennine chain, with its appended Cumbrian range, is succeeded by one which surpasses both these in loftiness and extent, but has its great nucleus much farther to the W., where it covers the greater part of Wales, deriving from this its name, the Cambrian range. Its principal ridge stretches through Carnarvonshire from N. N. E. to S. S. W., with Snowdon (3,571 feet) as the culminating point of south Great Britain. Across the Bristol channel from Wales is the Devonian range. It may be considered as commencing in the Mendip Hills of Somerset, and then pursuing a S. W. direction through that county and the counties of Devon and Cornwall to the Land's End, the wild and desolate tract of Dartmoor forming one of its most remarkable features (highest summit, Yes Tor, 2,050 feet). Other ranges are the Cotswold Hills, proceeding in a N. E. direction from near the Mendip Hills; the Chiltern Hills taking a similar direction farther to the E.; and the North and South Downs running E., the latter reaching the S. coast near Beachy Head, the former reaching the S. E. coast at Folkestone.

A large part of the surface of England consists of wide valleys and plains. Beginning in the N., the first vallevs on the E. side are those of the Soquet, Tyne, and Tees; on the W. the beautiful valley of the Eden, which, at first hemmed in between the Cumbrian range and Pennine chain, gradually widens out into a plain of about 470 square miles, with the town of Carlisle in its center. The most important of the N. plains is the Vale of York, which has an area of nearly 1,000 square miles. Properly speaking, it is still the same plain which stretches, with scarcely a single interruption, across the counties of Lincoln, Suffolk, and Essex, to the mouth of the Thames, and to a considerable distance inland, comprising the central plain and the region of the fens. On the W. side of the island, in South Lancashire and Cheshire, is the fertile Cheshire plain. In Wales there are no extensive plains, the valleys generally having a narrow, rugged form favorable to romantic beauty, but not compatible with great fertility. Wales, however, by giving rise to the Severn, can justly claim part in the vale, or series of almost unrivaled vales, along which it pursues its romantic course through the counties of Montgomery, Salop, Worcester, and Gloucester. S. E. of the Cotswold Hills is Salisbury plain, a large elevated plateau, of an oval

shape, with a thin, chalky soil only suitable for pasture. In the S. W. the only vales deserving of notice are those of Taunton in Somerset and Exeter in Devon. A large portion of the S. E. may be regarded as a continuous plain, consisting of the Wealds of Sussex, Surrey, and Kent, between the North and South Downs, and containing an area of about 1,000 square miles. The S. E. angle of this district is occupied by the Romney marsh, an extensive level tract composed for the most part of a rich marine deposit. Extensive tracts of a similar nature are situated on the E. coast, in Yorkshire and Lincoln, where they are washed by the Humber; and in the counties which either border the Wash, or, like Northampton, Bedford, Huntingdon, and Cambridge, send their drainage into it by the Nen and the Ouse. Many of these lands are naturally the richest in the kingdom; but have only been utilized by means of drainage.

England is well supplied with rivers, many of them of great importance to industry and commerce. Most of them carry their waters to the North Sea. If we consider the drainage as a whole, four principal river basins may be distinguished, those of the Thames, Wash, and Humber belonging to the German Ocean; and the Severn belonging to the Atlantic. The basin of the Thames has its greatest length from E. to W., 130 miles, and its average breadth about 50 miles, area 6,160 square miles. The river itself, which is the chief of English rivers, has a length of 215 miles. The basin of the Wash consists of the subordinate basins of the Great Ouse, Nen, Welland, and Witham, which all empty themselves into that estuary, and has an area computed at 5,850 square miles. The basin of the Severn consists of two distinct portions, that on the right bank, of an irregularly oval shape, and having for its principal tributaries the Teme and the Wye; and that on the left, of which the Upper Avon is the principal tributary stream. The area of the whole basin is 8,580 square miles. The next basin, that of the Humber, the largest of all, consists of the three basins of the Humber proper, the Ouse, and the Trent, and its area is 9,550 square miles, being about one-sixth of the whole area of England and Wales. Other rivers unconnected with these systems are the Tyne, Wear, and Tees, in the N. E.; the Eden, Ribble, Mersey, and Dee, in the N. W. The S. coast streams are very unimportant except for their estuaries.

Civil History.—The history of England proper begins when it ceased to be a Roman possession. On the withdrawal of the Roman forces, about the beginning of the 5th century A. D., the South Britons, or inhabitants of what is now called England, were no longer able to withstand the attacks of their ferocious N. neighbors, the Scots and Picts. They applied for assistance to Aëtius, but the Roman general was too much occupied to attend to their petition. In their distress they appear to have sought the aid of the Saxons; and according to the Anglo-Saxon narratives three ships, containing 1,600 men, were dispatched to their help under the command of the brothers Hengest and Horsa. Marching against the N. foe, they obtained a complete victory. The date assigned to these events is A. D. 449, the narratives asserting further that the Saxons, finding the land desirable, turned their arms against the Britons, and reinforced by new bands, conquered first Kent and ultimately the larger part of the island. It is certain that in the middle of the 5th century the occasional Teutonic incursions gave place to persistent invasion with a view to settlement. These Teutonic invaders were Low German tribes from the country about the mouths of the Elbe and the Weser, the three most prominent being the Angles, the Saxons, and the Jutes. Of these the Jutes were the first to form a settlement, taking possession of part of Kent, the Isle of Wight, etc., but the larger conquests of the Saxons in the S. and the Angles in the N. gave to these tribes the leading place in the kingdom. The struggle continued 150 years, and at the end of that period the whole S. part of Great Britain, with the exception of Strathclyde, Wales, and West Wales (Cornwall), was in the hands of the Teutonic tribes. This conquered territory was divided among a number of small states, seven of the most conspicuous of which are often spoken of as the Heptarchy. These were: (1) The kingdom of Kent; founded by Hengest in 455; ended in 823. (2) Kingdom of South Saxons, containing Sussex and Surrey; founded by Ella in 477; ended in 689. (3) Kingdom of East Angles containing Norfolk, Suffolk, Cambridge, Ely (Isle of); founded by Uffa in 571 or 575; ended in 792. (4) Kingdom of West Saxons, containing Devon, Dorset, Somerset, Wilts, Hants, Berks, and part of Cornwall; founded by Cerdic 519; swallowed up the rest in 827. (5) Kingdom of Northumbria, containing York, Durham, Cumberland, Westmoreland, Northumberland, and the E. coast of Scotland to the Firth of Forth; founded by Ida 547; absorbed by Wessex in 827. (6) Kingdom of East Saxons, containing Essex, Middlesex, Hertford (part); founded by Erchew in 527; ended in 823. (7) Kingdom of Mercia, containing Gloucester,

Hereford, Worcester, Warwick, Leicester, Rutland, Northampton Lincoln, Huntingdon, Bedford, Buckingham, Oxford, Stafford, Derby, Salop, Nottingham, Chester, Hertford (part); founded by Cridda about 584; absorbed by Wessex in 827. Each state was, in its turn, annexed to more powerful neighbors; and at length, in 827, Egbert, by his valor and superior capacity, united in his own person the sovereignty of what had formerly been seven kingdoms, and the whole came to be called England, that is Angle-land.

Meanwhile certain important changes had occurred. The conquest had been the slow expulsion of a Christian race by a purely heathen race, and the country had returned to something of its old isolation with regard to the rest of Europe. But before the close of the 6th century Christianity had secured a footing in the S. E. of the island. Ethelbert, King of Kent and suzerain over the kingdoms S. of the Humber, married a Christian wife, Bertha, daughter of Charibert of Soissons, and this event led indirectly to the coming of St. Augustine. The conversion of Kent, Essex, and East Anglia was followed by that of Northumberland and then by that of Mercia, of Wessex, of Sussex, and lastly of Wight, the contest between the two religions being at its height in the 7th century. The legal and political changes immediately consequent on the adoption of Christianity were not great, but there resulted a more intimate relation with Europe and the older civilizations, the introduction of new learning and culture, the formation of a written literature, and the fusion of the tribes and petty kingdoms into a closer and more lasting unity than that which could have been otherwise secured.

The kingdom, however, was still kept in a state of disturbance by the attacks of the Danes, who had made repeated incursions during the whole of the Saxon period, and about half a century after the unification of the kingdom became for the moment masters of nearly the whole of England. But Alfred the Great, who had ascended the throne in 871, defeated the Danes at Ethandune (887). Guthrum, their king, embraced Christianity, became the vassal of the Saxon king, and retired to a strip of land on the E. coast including Northumbria and called the Danelagh. The two immediate successors of Alfred, Edward (901-925) and Athelstan (925-940), the son and grandson of Alfred, had each to direct his arms against these settlers of the Danelagh. The reigns of the next five kings, Edmund, Edred, Edwy, Edgar, and Edward the Martyr, are chiefly remarkable on account of the conspicuous place occupied in them by Dunstan, who was counsellor to Edmund, minister of Edred, treasurer under Edwy, and supreme during the reigns of Edgar and his successor. It was possibly due to his policy that from the time of Athelstan till after the death of Edward the Martyr (978 or 979), the country had comparative rest from the Danes. During the 10th century many changes had taken place in the Teutonic constitution. Feudalism was already taking root; the king's authority had increased; the folkland was being taken over as the king's personal property; the nobles by birth, or earldormen, were becoming of less importance in administration than the nobility of thegns, the officers of the king's court. Ethelred (978-1016), who succeeded Edward, was a minor, the government was feebly conducted, and the incursions of the Danes became more frequent and destructive. A general massacre of them took place in 1002. The following year Sweyn invaded the kingdom with a powerful army and assumed the crown of England. Ethelred was compelled to take refuge in Normandy; and though he afterward returned, he found in Canute an adversary no less formidable than Sweyn. Ethelred left his kingdom in 1016 to his son Edmund, who displayed great valor, but was compelled to divide his kingdom with Canute; when he was assassinated in 1017, the Danes succeeded to the sovereignty of the whole.

Canute (Knut), who espoused the widow of Ethelred, obtained the name of Great, not only on account of his personal qualities but from the extent of his dominions, being master of Denmark and Norway as well as England. In 1035 he died, and in England was followed by the other two Danish kings, Harold and Hardicanute, whose joint reigns lasted till 1042, after which the English line was again restored in the person of Edward the Confessor. Edward was a weak prince, and in the latter years of his reign had far less real power than his brother-in-law Harold, son of the great earl Godwin. On Edward's death in 1066 Harold accordingly obtained the crown. He found a formidable opponent in the second cousin of Edward, William of Normandy, who instigated the Danes to invade the N. countries, while he, with 60,000 men, landed in the S. Harold vanquished the Danes, and hastening southward met the Normans near Hastings, at Senlac, afterward called Battle. Harold and his two brothers fell (Oct. 14, 1066), and William (1066-1087) immediately claimed the government as lawful King of England, being subsequently known as William I., the Conqueror. For some time he conducted the

government with great moderation; but being obliged to reward those who had assisted him, he bestowed the chief offices of government on Normans, and divided among them a great part of the country. The revolts of the native English which followed were quickly crushed, continental feudalism in a modified form was established, and the English Church reorganized under Lanfranc as Archbishop of Canterbury.

At his death, in 1087, William II., commonly known by the name of Rufus, the conqueror's second son, obtained the crown, Robert, the eldest son, receiving the Duchy of Normandy. In 1100, when William II. was accidentally killed in the New Forest, Robert was again cheated of his throne by his younger brother Henry (Henry I.), who in 1106 even wrested from him the Duchy of Normandy. Henry's power being secured, he entered into a dispute with Anselm the primate, and with the Pope, concerning the right of granting investiture to the clergy. He supported his quarrel with firmness, and brought it to a favorable issue. His reign was also marked by the suppression of the greater Norman nobles in England. In 1135 he died in Normandy, leaving behind him only a daughter, Matilda.

By the will of Henry I. his daughter Maud or Matilda, wife of Geoffrey Plantagenet, Count of Anjou, who had first been married to Henry V., Emperor of Germany, was declared his successor. But Stephen, son of the Count of Blois, and of Adela, daughter of William the Conqueror, raised an army in Normandy, landed in England, and declared himself king. After years of civil war and bloodshed it was agreed that Stephen should continue to reign during the remainder of his life, but that he should be succeeded by Henry, son of Matilda and the Count of Anjou. Stephen died in 1154, and Henry Plantagenet ascended the throne with the title of Henry II., being the first of the Plantagenet or Angevin kings. A larger dominion was united under his sway than had been held by any previous sovereign of England, for at the time when he became King of England he was already in the possession of Anjou, Normandy, and Aquitaine.

Henry II. found far less difficulty in restraining the license of his barons than in abridging the exorbitant privileges of the clergy, who were supported by the primate Becket. The king's wishes were formulated in the Constitutions of Clarendon (1164), which were at first accepted and then repudiated by the primate. The assassination of Becket, however, placed the king at a disadvantage in the struggle, and after his conquest of Ireland (1171) he submitted to the Church and did penance at Becket's tomb. Henry was the first who placed the common people of England in a situation which led to their having a share in the government. The system of frankpledge was revived, trial by jury was instituted by the Assize of Clarendon, and the Eyre courts were made permanent by the Assize of Nottingham. To curb the power of the nobles he granted charters to towns, thus laying the foundation of a new order in society.

Richard I., called Cœur de Lion, who in 1189 succeeded his father, Henry II., spent most of his reign away from England. Having gone to Palestine to join in the third crusade he proved himself an intrepid soldier. Returning homeward in disguise through Germany, he was made prisoner by Leopold, Duke of Austria, but was ransomed by his subjects. In the meantime John, his brother, had aspired to the crown, and hoped, by the assistance of the French, to exclude Richard from his right. Richard's presence for a time restored matters to some appearance of order; but having undertaken an expedition against France, he received a mortal wound at the siege of Chalons, in 1199.

John was at once recognized as King of England, and secured possession of Normandy; but Anjou, Maine, and Touraine acknowledged the claim of Arthur, son of Geoffrey, second son of Henry II. On the death of Arthur, while in John's power, these four French provinces were at once lost to England. John's opposition to the Pope in electing a successor to the see of Canterbury in 1205 led to the kingdom being placed under an interdict; and the nation being in a disturbed condition, he was at last compelled to receive Stephen Langton as archbishop, and to accept his kingdom as a fief of the papacy (1213). His exactions and misgovernment had equally embroiled him with the nobles. In 1213 they refused to follow him to France, and on his return defeated, they at once took measures to secure their own privileges and abridge the prerogatives of the crown. King and barons met at Runnymede, and on June 15, 1215, the Great Charter (Magna Charta) was signed. It was speedily declared null and void by the Pope, and war broke out between John and the barons, who were aided by the French king. In 1216, however, John died, and his turbulent reign was succeeded by the almost equally turbulent reign of Henry III.

During the first years of the reign of Henry III. the abilities of the Earl of Pembroke, who was regent until 1219, kept the kingdom in tranquillity; but

when, in 1227, Henry assumed the reins of government he showed himself incapable of managing them. The Charter was three times reissued in a modified form, and new privileges were added to it, but the king took no pains to observe its provisions. The struggle, long maintained in the great council (henceforward called Parliament), reached an acute stage in 1263, when civil war broke out. Simon de Montfort, who had laid the foundations of the House of Commons by summoning representatives of the shire communities to the Mad Parliament of 1258, had by this time engrossed the sole power. He defeated the king and his son Edward at Lewes in 1264, and in his famous Parliament of 1265 still further widened the privileges of the people by summoning to it burgesses as well as knights of the shire. The escape of Prince Edward, however, was followed by the battle of Evesham (1265), at which Earl Simon was defeated and slain, and the rest of the reign was undisturbed.

On the death of Henry III., in 1272, Edward I. succeeded without opposition. From 1276 to 1284 he was largely occupied in the conquest and annexation of Wales. When, in 1294, war broke out with France, Scotland also declared war. The Scots were defeated at Dunbar (1296), and the country placed under an English regent; but the revolt under Wallace (1297), was followed by that of Bruce (1306), and the Scots remained unsubdued. The reign of Edward was distinguished by many legal and legislative reforms, such as the separation of the old King's Court into the Court of Exchequer, Court of King's Bench, and Court of Common Pleas, the passage of the Statute of Mortmain, etc. In 1295 the first perfect Parliament was summoned. Two years later the imposition of taxation without consent of Parliament was forbidden by special act. The great aim of Edward, however, to include England, Scotland, and Wales in one kingdom proved a failure, and he died in 1307 marching against Robert Bruce.

The reign of his son Edward II. was unfortunate to himself and to his kingdom. At Bannockburn (1314), the English received a defeat from Robert Bruce which insured the independence of Scotland. The king soon proved incapable of regulating the lawless conduct of his barons; and his wife, a woman of bold, intriguing disposition, joined in the confederacy against him, which resulted in his imprisonment and death in 1327.

The reign of Edward III. was as brilliant as that of his father had been the reverse. The main projects of the third Edward were directed against France, the crown of which he claimed in 1328, in virtue of his mother, the daughter of King Philip. The victory won by the Black Prince at Crécy (1346), the capture of Calais (1347), and the victory of Poitiers (1356), ultimately led to the Peace of Brétigny in 1360, by which Edward III. received all the W. of France on condition of renouncing his claim to the French throne. Before the close of his reign, however, these advantages were all lost again, save a few principal towns on the coast.

Edward III. was succeeded in 1377 by his grandson Richard II., son of Edward the Black Prince. In 1380 an unjust and oppressive poll-tax brought their popular grievances to a head, and 100,000 men under Wat Tyler, marched toward London (1381). Wat Tyler was killed while conferring with the king, and the prudence and courage of Richard appeased the insurgents. In 1398 he banished his cousin, Henry Bolingbroke; and on the death of the latter's father, the Duke of Lancaster, unjustly appropriated his cousin's patrimony. To avenge the injustice Bolingbroke landed in England during the king's absence in Ireland, and at the head of 60,000 malcontents compelled Richard to surrender. He was confined in the Tower, and despite the superior claims of Edmund Mortimer, Earl of March, Henry was appointed king (1399), the first of the House of Lancaster. Richard was, in all probability, murdered early in 1400.

The manner in which the Duke of Lancaster, now Henry IV., acquired the crown rendered his reign extremely turbulent, but the vigor of his administration quelled every insurrection. The most important—that of the Percies of Northumberland, Owen Glendower, and Douglas of Scotland—was crushed by the battle of Shrewsbury (1403). During the reign of Henry IV. the clergy of England first began the practice of burning heretics. The act under which this was done was directed chiefly against the Lollards, as the followers of Wyclif now came to be called. Henry died in 1413, leaving his crown to his son, Henry V., who revived the claim of Edward III. to the throne of France in 1415, and invaded that country at the head of 30,000 men. The disjointed councils of the French rendered their country an easy prey; the victory of Agincourt was gained in 1415; and after a second campaign a peace was concluded at Troyes in 1420, by which Henry received the hand of Catherine, daughter of Charles VI., was appointed regent of France during the reign of his father-in-law, and declared heir to the throne on his death.

The two kings, however, died within a few weeks of each other in 1422, and the infant son of Henry thus became King of England (as Henry VI.) and France at the age of nine months.

England during the reign of Henry VI., was subjected to all the confusion incident to a long minority, and afterward to a civil war. Henry allowed himself to be managed by anyone who had the courage to assume the conduct of his affairs, and the influence of his wife Margaret of Anjou, was of no advantage either to himself or the realm. In France (1422-1453) the English forces lost ground, and were finally expelled by the celebrated Joan of Arc, Calais alone being retained. The rebellion of Jack Cade in 1450 was suppressed, only to be succeeded by more serious trouble. In that year Richard, Duke of York, the father of Edward, afterward Edward IV., began to advance his pretensions to the throne. His claim was founded on his descent from the third son of Edward III., who was his great-great-grandfather on the mother's side, while Henry was the great-grandson on the father's side of John of Gaunt, Duke of Lancaster, the fourth son of Edward III. Richard of York was also grandson on the father's side of Edmund, fifth son of Edward III. The wars which resulted, called the Wars of the Roses, from the fact that a red rose was the badge of the House of Lancaster and a white one that of the House of York, lasted for 30 years, from the first battle of St. Albans, May 22, 1455, to the battle of Bosworth, Aug. 22, 1485. Henry VI. was twice driven from the throne (in 1461 and 1471) by Edward of York, whose father had previously been killed in battle in 1460. Edward of York reigned as Edward IV. from 1461 till his death in 1483, with a brief interval in 1471; and was succeeded by two other sovereigns of the House of York, first his son Edward V., who reigned for 11 weeks in 1483; and then by his brother Richard III., who reigned from 1483 till 1485, when he was defeated and slain on Bosworth field by Henry Tudor, of the House of Lancaster, who then became Henry VII.

Henry VII. was at this time the representative of the House of Lancaster, and in order at once to strengthen his own title, and to put an end to the rivalry between the Houses of York and Lancaster, he married in 1486 Elizabeth, the sister of Edward V. and heiress of the House of York. His reign was disturbed by insurrections attending the impostures of Lambert Simnel (1487) and Perkin Warbeck (1488); but neither of these attained any magnitude. The king's worst fault was avarice. His administration throughout did much to increase the royal power and to establish order and prosperity. He died in 1509.

The authority of the English crown, which had been so much extended by Henry VII., was by his son Henry VIII. exerted in a tyrannical and capricious manner. The most important event of the reign was undoubtedly the Reformation; though it had its origin rather in Henry's caprice and in the casual situation of his private affairs than in his conviction of the necessity of a reformation in religion, or in the solidity of reasoning employed by the reformers. Henry had been espoused to Catherine of Spain, who was first married to his elder brother Arthur, who died young. Henry became enamored of one of her maids of honor, Anne Boleyn. He had recourse to the Pope to dissolve his marriage; but failing in his desires he broke away entirely from the Holy See, and in 1534 got himself recognized by act of Parliament as the head of the English Church. He died in 1547. He was married six times, and left three children, each of whom reigned in turn. These were: Mary, by his first wife, Catherine of Aragon; Elizabeth, by his second wife, Anne Boleyn; and Edward by his third wife, Jane Seymour.

Edward, who reigned first with the title of Edward VI., was nine years of age at the time of his succession, and died in 1553, when he was only 16. His short reign, or rather the reign of the Earl of Hertford, afterward Duke of Somerset, who was appointed regent, was distinguished chiefly by the success which attended the measures of the reformers, who acquired great part of the power formerly engrossed by the Catholics. The intrigues of Dudley, Duke of Northumberland, during the reign of Edward, caused Lady Jane Grey to be declared his successor; but her reign, if it could be called such, lasted only a few days. Mary, daughter of Henry VIII. was placed on the throne, and Lady Jane Grey and her husband were both executed. Mary seems to have wished for the crown only for the purpose of re-establishing the Roman Catholic faith. Political motives had induced Philip of Spain to accept of her as a spouse; but she could never prevail on her subjects to allow him any share of power. She died in 1558.

Elizabeth, who succeeded her sister Mary, was attached to the Protestant faith, and found little difficulty in establishing it in England. Having concluded peace with France (1559), Elizabeth set herself to promote the confusion which prevailed in Scotland, to which her

cousin Mary had returned from France as queen in 1561. In this she was so far successful that Mary placed herself in her power (1568), and after many years' imprisonment was sent to the scaffold (1587). As the most powerful Protestant nation, and as a rival to Spain in the New World, it was natural that England should become involved in difficulties with that country. The dispersion of the Armada by the English fleet under Howard, Drake, and Hawkins was the most brilliant event of a struggle which abounded in feats of valor. In Elizabeth's reign London became the center of the world's trade, the extension of British commercial enterprise being coincident with the ruin of Antwerp in 1585. The Parliament was increased, and its members were exempted from arrest. In literature not less than in politics and in commerce the same full life displayed itself, and England began definitely to assume the characteristics which distinguish her from the other European nations of to-day.

To Elizabeth succeeded (in 1603) James VI. of Scotland and I. of England, son of Mary Queen of Scots and Darnley. His accession to the crown of England in addition to that of Scotland did much to unite the two nations, though a certain smoldering animosity still lingered. His dissimulation, however, ended in his satisfying neither of the contending ecclesiastical parties—the Puritans or the Catholics; and his absurd insistence on his divine right made his reign a continuous struggle between the prerogative of the crown and the freedom of the people. His extravagance kept him in constant disputes with the Parliament, and compelled him to resort to monopolies, loans, benevolences, and other illegal methods. The nation at large, however, continued to prosper. His son, Charles I., who succeeded him in 1625, inherited the same exalted ideas of royal prerogative, and his marriage with a Catholic, his arbitrary rule, and illegal methods of raising money, provoked bitter hostility. Civil war broke out in 1642, between the king's party and that of the Parliament, and the latter proving victorious, in 1649 the king was beheaded.

A commonwealth or republican government was now established, in which the most prominent figure was Oliver Cromwell. Mutinies in the army among Fifth-monarchists and Levellers were subdued by Cromwell and Fairfax, and Cromwell in a series of masterly movements subjugated Ireland and gained the important battles of Dunbar and Worcester. At sea Blake had destroyed the Royalist fleet under Rupert, and was engaged in an honorable struggle with the Dutch under Van Tromp. But within the governing matters had come to a deadlock. A dissolution was necessary, yet Parliament shrank from dissolving itself and in the meantime the reform of the law, a settlement with regard to the Church, and other important matters remained untouched. In April, 1653, Cromwell cut the knot by forcibly ejecting the members and putting the keys in his pocket. From this time he was practically head of the government, which was vested in a council of 13. A Parliament —the Little or Barebones Parliament— was summoned and in December of the same year Cromwell was installed Lord Protector of the Commonwealth of England, Scotland, and Ireland. With more than the power of a king, he succeeded in dominating the confusion at home and made the country feared thoughout the whole of Europe. Cromwell died in 1658, and the brief and feeble protectorate of his son Richard followed.

There was now a wide-spread feeling that the country would be better under the old form of government, and Charles II., son of Charles I., was called to the throne by the Restoration of 1660. He took complete advantage of the popular reaction from the narrowness and intolerance of Puritanism, and even latterly endeavored to re-establish the Catholic religion. The promises of religious freedom made by him before the Restoration in the Declaration of Breda were broken by the Test and Corporation Acts, and by the Act of Uniformity, which drove 2,000 clergymen from the Church and created the great dissenting movement of modern times. The Conventicle and Five-Mile Acts followed, and the "Drunken Parliament" restored Episcopacy in Scotland. At one time even civil war seemed again imminent. The abolition of the censorship of the press (1679) and the reaffirmation of the Habeas Corpus principle are the most praiseworthy incidents of the reign.

As Charles II. left no legitimate issue, his brother, the Duke of York, succeeded him as James II. (1685-1688). An invasion by an illegitimate son of Charles, the Duke of Monmouth, who claimed the throne, was suppressed, and the king's arbitrary rule was supported by the wholesale butcheries of Kirke and Jeffreys. The king's zealous countenance of Roman Catholicism and his attempts to force the Church and the universities to submission provoked a storm of opposition. The whole nation was prepared to welcome any deliverance, and in 1688 William of Orange, husband of James' daughter Mary, landed in Torbay. James

fled to France, and a convention summoned by William settled the crown on him, he thus becoming William III. Annexed to this settlement was a Declaration of Rights, circumscribing the royal prerogative. This placed henceforward the right of the British sovereign to the throne on a purely statutory basis. A toleration act, passed in 1689, released dissent from many penalties.

In 1692 originated the national debt, the exchequer having been drained by the heavy military expenditure. A bill for triennial Parliaments was passed in 1694, the year in which Queen Mary died. For a moment after her death William's popularity was in danger, but his successes at Namur and elsewhere, and the obvious exhaustion of France, once more confirmed his power. The treaty of Ryswick followed in 1697, and the death of James II. in exile in 1701 removed a not unimportant source of danger. Early in the following year William also died, and by the act of settlement Anne succeeded him.

The closing act of William's reign had been the formation of the grand alliance between England, Holland, and the German Empire, and the new queen's rule opened with the brilliant successes of Marlborough at Blenheim (1704) and Ramillies (1706). Throughout the earlier part of her reign the Marlboroughs practically ruled the kingdom, the duke's wife, Sarah Jennings, being the queen's most intimate friend and adviser. In 1707 the history of England becomes the history of Great Britain, the Act of Union passed in that year binding the Parliaments and realms of England and Scotland into a single and more powerful whole. On the death of Anne, the House of Brunswick came to the throne in the person of George I. (1714-1727). The principal events of the reign were abortive Jacobite risings, the divorce of the queen, and the "South Sea bubble." George II. ascended the throne in 1727. His reign was prosperous, but not very eventful, except for the rebellion under the young pretender. George III. became king in 1760. Under his rule, the British Empire in India was founded, the American colonies established their independence, and the French Revolution burst forth. England was for a time on the verge of ruin. The national debt reached enormous proportions. But the genius of Chatham, Pitt, Fox, Nelson, Clive and Wellington rescued the country, after the failure of George III.'s plan of personal government had been demonstrated. During this reign the legislative union of Great Britain and Ireland was effected. The king died in 1820, and was succeeded by George IV. His reign of 10 years witnessed Roman Catholic emancipation, the first development of England as a colonial power in the sense of to-day, and marked industrial expansion. William IV. ruled seven years (1830-1837). During this period the great Reform Bill, extending the suffrage, marked the dawn of the democratic era in English politics.

Victoria became Queen of England in 1837, and died Jan. 22, 1901, her reign being the longest in the country's history. Her sway covered the period which embraces the revolutions of 1848 throughout Europe, the wars of Prussia against Austria and France, the Crimean war, the Civil War in the United States, the struggle for Egypt and the control of Afghanistan, the problem of China and the conflict with the Boers which ended with the absorption of the Transvaal and the South African Republic into the British Empire. The matters of purely domestic concern were the corn-law agitation, the condition of the working classes, trade-union regulation, free trade and popular education. During these years, the naval supremacy of England was maintained, the colonial empire of Great Britain was cemented and strengthened, and home rule, in the face of persistent agitation, was refused to Ireland. There was a very democratic extension of the suffrage during one of the Gladstone administrations. The Indian Empire did not, on the whole, prosper during the period from 1890 to 1900, but the occupation of Egypt, dating from 1882, was successful. The British North American Act of 1867 and the Commonwealth of Australia Act of 1900 indicated the tendency to imperial federation, of which England's commanding position makes her the center. The royal power meanwhile waned to an extent which, with the extension of suffrage, left the country practically a democracy at the end of the 19th century. Edward VII. became king in 1901.

In 1902 the New Education Bill was enacted and in the following year a Land Act for Ireland was passed, which provided for the distribution of £100,000,000 to tenants for the purpose of enabling them to acquire ownership of land. The distribution was made in the form of long-term loans. In the same year Joseph Chamberlain introduced a proposal for the modification of the fiscal arangements of the country which was equivalent to the abandonment of free trade. He proposed that the United Kingdom should enforce a duty on food imports from foreign countries and admit products from the colonies free. This question was agitated both within and without Parliament for several years,

but with no political results. The Balfour cabinet resigned in 1905. A Liberal Ministry was organized by Sir Henry Campbell-Bannerman. In foreign politics British prestige following the South African War was greatly increased. An alliance was made with Japan in 1902 and 1905. Trade relations were established with Tibet in 1904. In the same year the position of England in Egypt improved by an agreement with France by which the latter gave her approval to the British acquisition of that country.

In 1907 relations which had been growing increasingly strained between the House of Commons and the House of Lords brought about a desire for a modification of the powers of the latter body. This was accomplished in 1911 when a bill was passed depriving the House of Lords of practically all power over money bills and providing other curbs on the power of the Upper House. An old-age pension bill was passed in 1908. In the year following, David Lloyd George became Chancellor of the Exchequer, and he at once began preparations of measures to produce increased revenues. These included a tax on land which met with wide opposition, especially in the House of Lords, which defeated it. The government went twice to the country in 1910 on this issue and was each time sustained. Edward VII. died in 1910 and was succeeded by George V. In 1914 the Home Rule Bill for Ireland was passed, as well as a bill disestablishing the Anglican Church in Wales. The Home Rule Bill was deferred on account of the outbreak of the World War.

When the war began in August, 1914, political conditions were most unfavorable. Ireland was on the verge of Civil War. The army was in poor condition and there were disagreements with the colonies in regard to the naval policy, and other matters. In spite of these conditions, however, England went into the war with great enthusiasm. War measures were passed providing for the authorization of war credits, and other legislation aiming at a successful prosecution of the war was put into effect. For an account of the part taken by England and Great Britain in the World War, see that title. See also articles on the separate battles, CANADA, AUSTRALIA, MESOPOTAMIA, EGYPT, PALESTINE, TURKEY, etc.

Although by April, 1915, 750,000 men had been sent to the front it was evident that more man power must be supplied. Conscription was proposed by many prominent men but did not at first meet with favor. A great campaign of recruiting was carried on in 1915 which resulted in the enlistment of about 830,000 men. In January, 1916, a military-service bill was introduced in Parliament. This provided that all bachelors and widowers between the ages of 18 and 41 were liable for military service. Ireland was excluded from the operation of the bill. The bill was finally passed in May, 1916.

One of the chief problems to be met by the government was the question of munitions, which during the first period of the war was entirely inadequate to meet the demands of the rapidly forming new army. The Munitions Act was passed which provided for government supervision of all manufacturing, which made strikes and lockouts illegal.

In May, 1915, as a result of the cabinet crisis, a coalition cabinet was formed consisting of 12 Liberals, 8 Unionists, and one Labor member. In December, 1915, Parliament introduced a bill prolonging its life for 12 months. By a later compromise this was reduced to 8 months.

In April, 1916, a serious outbreak occurred in Ireland under the direction of Sir Roger Casement. (See IRELAND.) In February, 1917, a bill was introduced into Parliament requiring all men between the ages of 18 to 61 to be enrolled. This bill was passed in March. Among other important events of 1917 were the introduction of the new budget which largely increased taxation besides providing for electoral reforms and woman suffrage. In March of that year the First Imperial War Cabinet including representatives from all British dominions was held in London. The Irish question continued to be the most serious domestic problem during this year. During 1918 many stringent measures were passed providing for increased efficiency in war work. A new military-service bill was enacted in April. This provided military service from every British male between the ages of 18 and 51 who had been in England since August, 1915. The second session of the Imperial War Cabinet took place June 10, 1918. The House of Commons in October of this year passed a measure providing for the membership of women in Parliament. A general election was held on December 14, 1918. The Liberal party was divided into two factions, one of which supported Lloyd George and the other Asquith. The Coalition Government was successful in the election, electing almost 5 to 1 of its members as candidates. This marked the complete overthrow of the Asquith Liberals and the Pacifists. During the year an Irish convention was held for

the purpose of arriving at some agreement between the Irish factions. This, however, resulted in no substantial success and the Irish question was still unsettled at the end of the year.

When Parliament met in 1919 the traditional party lines were more or less obliterated. Several of the most conspicuous members, including Mr. Asquith, had lost their seats. David Lloyd George had been Prime Minister since December 7, 1916, and from that period until the end of the war he was the strongest figure and practically a dictator of the English government. He was given the fullest possible powers and was in most cases warmly supported by the people. With President Wilson, he was the most conspicuous figure at the Peace Conference in 1919. During 1919 economic conditions in England were very unfavorable and there were frequent strikes in the industrial centers. A threatened strike of the coal miners resulted in the formation of a coal commission, which succeeded in recommending conditions which were accepted by the miners. The railway strike was in force during the latter part of the year, but was broken by lack of support by the people. During 1919 the Prince of Wales visited the United States, where he was received with great enthusiasm. In February 10, 1920, Parliament began a new session. Herbert Asquith, the former premier, was elected to the House of Commons from Paisley. After remaining in session until August 16, the House of Commons adjourned until October 19. At the beginning of the session on that date, supplementary army estimates were introduced bringing the total estimates for the year to about £165,000,000.

During 1920 and 1921 disorder continued in Ireland. In some portions of the country a practical condition of civil war existed. For an account of these conditions, see IRELAND. The Irish Home Rule Bill was signed by King George in December, 1920, which was to go into effect at the discretion of the king.

In 1921 agreement was made with France in regard to the control of Syria and Palestine, and a practical protectorate was established over Mesopotamia. Egypt had already become an integral part of the British Empire. In March, 1921, the Supreme Council of the Peace Conference held sessions in London to decide the question of reparations by Germany.

For statistical data relating to England, see GREAT BRITAIN. For the territory embraced in the Empire, see BRITISH EMPIRE. See also articles on the various subdivisions of the Empire, as AUSTRALIA, CANADA, NEW ZEALAND, INDIA, etc.

SOVEREIGNS OF ENGLAND

	Began to reign.
ANGLO SAXON LINE—	
Egbert	800
Ethelwulf	836
Ethelbald	857
Ethelbert	860
Ethelred	866
Alfred	871
Edward the Elder	901
Athelstan	925
Edmund	940
Edred	946
Edwy	955
Edgar	957
Edward the Martyr	975
Ethelred the Unready	978
Edmund Ironside	1016
DANISH LINE—	
Canute	1017
Harold I.	1036
Hardicanute	1039
SAXON LINE—	
Edward the Confessor	1041
Harold II.	1066
NORMAN LINE—	
William I.	1066
William II.	1087
Henry I.	1100
HOUSE OF BLOIS—	
Stephen	1135
PLANTAGENET LINE—	
Henry II.	1154
Richard I.	1189
John	1199
Henry III.	1216
Edward I.	1272
Edward II.	1307
Edward III.	1327
Richard II.	1377
HOUSE OF LANCASTER—	
Henry IV.	1399
Henry V.	1413
Henry VI.	1422
HOUSE OF YORK—	
Edward IV.	1461
Edward V.	1483
Richard III.	1483
HOUSE OF TUDOR—	
Henry VII.	1485
Henry VIII.	1509
Edward VI.	1547
Mary	1553
Elizabeth	1558
STUART LINE—	
James I.	1603
Charles I.	1625
COMMONWEALTH	1649
STUART LINE—	
Charles II.	1660
James II.	1685
HOUSE OF ORANGE—	
William and Mary	1688
STUART LINE—	
Anne	1702
BRUNSWICK LINE—	
George I.	1714
George II.	1727
George III.	1760
George IV.	1820
William IV.	1830
Victoria	1837
Edward VII.	1901
WINDSOR LINE—	
George V.	1910

ENGLAND, CHURCH OF, the official name of that body of Christians who have a formal head in the person of the hereditary ruler of England. This designation is used in two senses: first, a general one signifying the Church regarded as continuous, which, from the first triumph of Christianity till now, has been that of the English people; secondly, in a more specific sense, the Protestant Church now established in England as distinguished from the Church of Rome.

The evangelistic zeal of Whitfield, Wesley, and various other clergymen, in the 18th century, awoke the Church to new life, which did not pass away even when the followers of these two great preachers ceased to belong to the English Church. The evangelical party, still the most numerous in the Establishment, is, in large measure, the fruit of 18th century revival effort. In the 19th, the movement was in other directions. With 1833, just after the passing of the first Reform Bill, the first of a series of "Tracts for the Times" came forth, and 90 in all were issued within the next eight years. The ritualistic party, at a later date, carried on the work which

the tractarians had begun. In 1860 the "Essays and Reviews," and in 1862 a work by Bishop Colenso on the Pentateuch, gave prominence to the opposite pole of thought, being what theologians call strongly rationalistic. Church congresses, bringing the representatives of these three parties face to face, softened their antagonisms, and fear of common danger renders them more united than they otherwise would be.

In the English Church there are 3 archbishops (Canterbury, York, and Wales) and 143 bishops, and 39 suffragan and assistant bishops, 2 of the archbishops and 24 of the bishops having seats in the House of Lords; subordinate to these are 30 deans, 100 archdeacons, 613 rural deans, and about 13,500 beneficed clergy, the whole clerical staff of all grades being about 23,000. The total membership throughout the world in 1919 was estimated at over 6,000,000, of whom about 2,400,000 were in England and Wales, about 576,000 in Ireland, about 56,000 in Scotland, and about 3,000,000 in other parts of the world. Previous to 1871, the English Church and the Established Church of Ireland, constituted but a single body, called the United Church of England and Ireland. It is powerful also in the colonies, and by means of its two great societies, the Propagation and the Church Missionary Societies, acts powerfully on nearly every part of the heathen world. The Church in Wales and Monmouthshire was disestablished and disendowed by an act passed in 1914 which came into force in 1920.

Under the National Assembly of the Church of England (Powers) Act of 1919 there is, in England, a National Assembly, consisting of a House of Bishops, a House of Clergy, and a House of Laymen, and having power to legislate regarding Church matters.

ENGLEWOOD, a city of New Jersey, in Bergen co. It is on the Erie railroad. It is chiefly a residential city, and contains a hospital, a public library, and other public buildings. Pop. (1910) 9,924; (1920) 11,627.

ENGLISH, THOMAS DUNN, an American author; born in Philadelphia, Pa., June 29, 1819; was graduated in medicine at the University of Pennsylvania in 1839; admitted to the bar in 1842; engaged in journalism in New York in 1844-1859; then resumed medical practice in Newark, N. J. He was a member of the state assembly in 1863-1864, and of Congress in 1891-1895. He was the author of "Ben Bolt," an exceedingly popular ballad (1843); "Walter Woolfe" (1842); "Ambrose Fecit, or the Peer and the Painter" (1869); "American Ballads" (1882); "Book of Battle Lyrics" (1886); "Jacob Schuyler's Millions" (1886); "Old Glory" song (1898); etc. He died in 1902.

ENGLISH, WILLIAM HAYDEN, an American capitalist; born in Lexington, Ind., Aug. 27, 1822; received a college education and became a lawyer; was elected to Congress in 1852 and served there through four consecutive terms. As a member of the Committee on Territories, in opposition to his own party, he worked against the admission of Kansas to the Union. He reported from the Committee of Conference what was known as the "English bill," in which it was urged that the question of admission be referred back to the people of Kansas according to the provision of the Lecompton constitution. This bill was adopted and the people voted against admission. He strongly opposed secession. In 1861 he retired to private life; was president of the First National bank of Indianapolis, in 1863-1877, and was also interested in railroads. In 1880 he was the Democratic nominee for Vice-President on the ticket with General Hancock. He published a historical and biographical work on the constitution and lawmakers of his State. He died in Indianapolis, Ind., Feb. 7, 1896.

ENGLISH CHANNEL, the arm of sea which separates England from France, extending on the English side, from Dover to Land's End; and on the French from Calais to the island of Ushant. On the E. it communicates with the German Ocean by the Strait of Dover, 21 miles wide; and on the W. it opens into the Atlantic by an entrance about 100 miles wide. At its greatest breadth it is about 150 miles. The pilchard and mackerel fisheries are very important.

The advantages of a railway tunnel across the Channel at its narrowest part have been frequently urged; and an English company formed for the purpose of constructing a tunnel half way across from Dover to meet a similar tunnel starting from near Calais, pushed an excavation under the sea for over 2,000 yards, but was interdicted by the British government for military reasons. This tunnel would have a total length of 23 miles.

ENGLISH LANGUAGE, a member of the Teutonic family of languages, which form three groups: (1) Low German. (2) Scandinavian, and (3) High German. The English language belongs to the first of these groups. The Teutonic languages themselves form a subdivision of the European division of that great

family of languages called Indo-European. The English language is closely related to dialects still spoken on the N. shores and lowlands of Germany. The original inhabitants of England were Celts, and but few words of their language survive.

The language introduced by the Teutonic invaders was an inflected language, and free from admixture of foreign elements. But the English of the present day, which is a direct development of the Anglo-Saxon, has lost its inflections, and has adopted words freely from other tongues. First it adopted many words from the Roman missionaries, by whom the island was converted to Christianity in A. D. 596. Secondly, a large number were adopted from the Northmen (the Norwegians, Danes, and Swedes). These words are numerous in old Northern English literature, and in Northern provincial dialects. A few still survive. But the event which exercised the greatest influence on the English language was the Norman invasion in 1066. After this, French became the language of the court, of the nobility, the clergy, and of literature, and continued to be so for nearly 300 years. In 1349 Latin ceased to be taught in schools through the medium of French, and in 1362, the pleadings in the law courts were directed by act of Parliament to be for the future conducted in English. But the English of the end of the 14th century had become, through the influence of the Norman-French, analytic; that is to say, prepositions and auxiliaries were used instead of inflections to express the various modifications of the idea to be conveyed.

The English language may be divided into five periods:

1. First Period A. D. 450-1100.
2. Second Period A. D. 1100-1250.
3. Third Period A. D. 1250-1350.
4. Fourth Period A. D. 1350-1460.
5. Fifth Period A. D. 1460-the present day.

In the first period (called also Anglo-Saxon or Old English), the language was inflectional; in the second it began to show a tendency to become analytic, the tendency increasing till in the fourth period inflections had virtually disappeared. Before the Norman conquests there were two dialects in English, a Southern and a Northern, the former of which was the literary language. After the Conquest dialects became much more marked, so that we can distinguish three great varieties, the Northern, the Midland, and the Southern, distinguished from each other by various grammatical differences. The Midland dialect was that most widely spread, and it ultimately became the standard language, a result principally due to the influence of Chaucer, and in a less degree of Wyclif, Gower, and others.

ENGLISH LITERATURE, the mass of expression in written prose and poetry, of the mind of the English-speaking peoples, through the medium of the English language.

Before any English literature, in the strict sense of the term, existed, four literatures had arisen in England—the Celtic, Latin, Anglo-Saxon, and Anglo-Norman. The first included the name of Merlin. The Latin literature prior to the Conquest presented the names of Bede, Alcuin, and Asser. With the coming of the Normans the native language practically ceased for a time to be used in literature, Latin being employed in law, history, and philosophy, French in the lighter forms of literature. The Norman trouvère displaced the Saxon scop, or gleeman, introducing the fabliau and the romance. By the fabliau the literature was not greatly influenced till the time of Chaucer; but the romance attained an early and striking development in the Arthurian cycle, founded on the legends of Geoffrey of Monmouth's Latin "History of the Britons" (1147), by Geoffrey Gaimar, Maistre Wace, Walter Map, and other writers of the 12th century. The Latin literature included important contributions to the Scholastic philosophy by Alexander Hales (died 1245), Duns Scotus (died 1308), the philosophic works of Roger Bacon (1214-1292), the Golias poems of Walter Map, and a long list of chronicles or histories, either in prose or verse, by Eadmer (died 1124), William of Malmesbury (died 1143), Geoffrey of Monmouth (died 1154), Henry of Huntingdon (died after 1154), Joseph of Exeter (died 1195), Roger of Wendover (died 1237), Roger de Hoveden (12th and 13th centuries), Joscelin de Brakelonde (12th and 13th centuries), and Matthew Paris (died 1259).

Apart from a few brief fragments, the first English writers after the Conquest are the "Brut" of Layamon (about 1200), and the "Ormulum," a collection of metrical homilies attributed to Orm or Ormin, an Augustine monk. Next in importance come the rhyming chroniclers Robert of Gloucester (time of Henry III., Edward I.) and Robert of Brunne or Mannyng (died 1340). To this pre-Chaucerian period belong also several English translations of French romances. Between the beginning and middle of the 14th century a rapid expansion of the literature took place,

having as the foremost figure Chaucer (1340-1400). Contemporary with him were the poets William or Robert Langland (1332-1400), John Gower (1325-1408), John Barbour (1316-1395). In prose the name of John Wyclif (1324-1384) is pre-eminent.

The period from the time of Chaucer to the appearance of Spenser (from the end of the 14th to near the end of the 16th century), is a very barren one in English literature. The center of poetic creation was for the time transferred to Scotland, where James I. (1394-1437) headed the list, which comprises Andrew de Wyntoun (15th century), Henry the Minstrel or Blind Harry (died after 1492), William Dunbar (1460-15—), Gavin Douglas (1474-1522), and Sir David Lyndsay (1490-1557). In England the only noteworthy prose prior to that of More being that of Reginald Pecock (1390-1460), Sir John Fortescue (1395-1485), the "Paston Letters" (1422-1505), and Malory's "Morte d'Arthur" (completed 1469-1470); the only noteworthy verse, that of John Skelton (1460-1529).

The Renaissance spread from Florence to England by means of Colet, Linacre, Erasmus, and Sir Thomas More (1480-1535), the last noteworthy as at the head of a new race of historians. Important contributions to the prose of the time were the Tyndale New Testament, printed in 1525, and the Coverdale Bible (1535). The first signs of an artistic advance in poetic literature are to be found in Wyatt (1503-1542) and Surrey (1516-1547), who nationalized the sonnet, and of whom the latter is regarded as the introducer of blank verse. The drama too, had by this time reached a fairly high stage of development. At length farces on the French model were constructed, the interludes of John Heywood (died 1565) being the most important examples. To Nicholas Udall (1504-1556) the first comedy, "Ralph Roister Doister," was due. The first tragedy was performed in 1561, and the first prose play, the "Supposes" of Gascoigne, in 1566. The most prominent figures are those of Sidney (1554-1586) and Spenser (1552-1599). In drama Lyly, Peele, Greene, Nash and Marlowe (1564-1593) are the chief immediate precursors of Shakespeare (1564-1606), Marlowe, alone, however, being at all comparable with him. Contemporary and later dramatic writers were Ben Jonson (1573-1637), Middleton (died 1627), Marston (better known as a satirist), Chapman (1557-1634), Thomas Heywood, Dekker (died 1639), Webster (17th century), Ford (1586-1639), Beaumont (1586-1616) and Fletcher (1576-1625), and Massinger (1584-1640). The minor poets include Michael Drayton (1563-1631), Samuel Daniel (1562-1619), John Davies (1570-1626), John Donne (1573-1631), Giles Fletcher (1580-1623), and Phineas Fletcher (1584-1650), Drummond of Hawthornden (1585-1649). In Elizabethan prose the prominent names are those of Rogers Ascham (1515-1568), Lyly the Euphuist (1553-1606), Hooker (1554-1600), Raleigh (1552-1618), Bacon (1561-1626), the founder in some respects of modern scientific method, Burton (1576-1640), Herbert of Cherbury (1581-1648), and Selden (1584-1654), with Overbury, Knolles, Holinshed, Stowe, Camden, Florio, and North. The issue of the authorized version of the Bible in 1611 closed the prose list of the period.

After the death of James I. the course of literature breaks up into three stages, the first from 1625 to 1640, in which the survivals from the Elizabethan age slowly died away. The "metaphysical poets," Cowley, Wither, Herbert, Crashaw, Habbington, and Quarles, and the cavalier poets, Suckling, Carew, Denham, all published poems before the close of this period, in which also Milton's early poems were composed, and the "Comus" and "Lycidas" published. The second stage (1640-1660) was given up almost wholly to controversial prose, the Puritan revolution checking the production of pure literature. In this controversial prose Milton was easily chief. With the restoration a third stage was begun. Milton turned his new leisure to the composition of his great poems; the drama was revived, and Davenant and Dryden, with Otway, Southerne, Etherege, Wycherley, Congreve, Vanbrugh, and Farquhar in their first plays, and minor playwrights, are the most representative writers of the period. Butler established a genre in satire, and Marvel as a satirist in some respects anticipated Swift; Roscommon, Rochester, and Dorset contributed to the little poetry; while in prose we have Hobbes, Clarendon, Fuller, Sir Thomas Browne, Walton, Cotton, Pepys, and Evelyn, John Bunyan, Locke, Sir William Temple, Owen Feltham, Sir Henry Wotton, James Harrington, and a crowd of theological writers, of whom the best known are Jeremy Taylor, Richard Baxter, Robert Barclay, William Penn, George Fox, Isaac Barrow, John Tillotson, Stillingfleet, Bishop Pearson, Sherlock, South, Sprat, Cudworth, and Burnet. Other features of the last part of the 17th century were the immense advance in physical science under Boyle, Isaac Newton, Harvey, and others, and the rise of the newspaper press.

Dryden's death in 1700 marks the

commencement of the so-called Augustan age in English literature. During it, however, no greater poet appeared than Pope (1688-1744). Against the formal limits of his conception of poetry signs of reaction were apparent in the verse of Thomson (1700-1748), Gray (1716-1771), Collins (1720-1759), Goldsmith (1728-1774), and in the productions of Macpherson and Chatterton. The poets Prior (1664-1721), Gay (1688-1732), and Ambrose Phillips (1671-1749), inherited from the later 17th century, Gay being memorable in connection with English opera; and there were a large number of small but respectable poets — including Parnell, Shenstone, Blair, Akenside, Anstey, Beattie, and Allan Ramsay. It was in prose that the chief development of the 18th century was found. Defoe (1661-1731) and Swift (1667-1745) led the way in fiction and prose satire; Steele (1671-1729) and Addison (1672-1719), working on a suggestion of Defoe, established the periodical essay; Richardson (1689-1761), Fielding (1707-1754), Smollett (1721-1771), and Sterne raised the novel to sudden perfection. Goldsmith also falls into the fictional group as well as into those of the poets and the essayists. Johnson (1709-1784) exercised during the latter part of his life the power of a literary dictator, with Boswell (1740-1795) as literary dependent. The other chief prose writers were Bishop Berkeley (1685-1753), Arbuthnot (1675-1735), Shaftesbury (1671-1713), Bolingbroke (1678-1751), Burke, the historians David Hume (1711-1776), William Robertson (1721-1793), Edmund Gibbon (1737-1794); the political writers Wilkes and Junius, the economist and moral philosopher Adam Smith (1723-1790); the philosophical writers Humey Bentham (1749-1832), and Dugald Stewart (1753-1828), the scholars Bentley (1662-1742), Sir William Jones (1746-1794), and Richard Porson (1759-1808); the theologians Atterbury, Butler (1692-1752), Warburton, and Paley, and some inferior playwrights, of whom Rowe, John Home, Colley Cibber, Colman the elder, Foote, and Sheridan were the most important.

With the French Revolution, or a few years earlier, the modern movement in literature began. The departure from the old traditions, traceable in Gray and Collins, was more clearly exhibited in the last years of the century in Cowper (1731-1800) and Burns (1759-1796), and was developed and perfected in the hands of Blake (1757-1828), Bowles (1762-1850), and the "Lake poets" Wordsworth (1770-1850), Coleridge (1772-1834), and Southey (1774-1843); but there were at first many survivals from the poetic manner of the 17th century, such as Erasmus Darwin (1731-1802), Dr. John Wolcot (1738-1819), Robert Bloomfield (1766-1823), and Samuel Rogers (1763-1855). Among the earlier poets of the century, also, were George Crabbe (1754-1832), Sir Walter Scott (1771-1832), Hogg (1772-1835), Campbell (1777-1844), James Montgomery, Mrs. Hemans Byran, Waller Procter ("Barry Cornwall") Milman, L. E. Landon, Joanna Baillie, Robert Montgomery. A more important group was that of Byron (1788-1824), Shelley (1792-1822), and Keats (1796-1821), with which may be associated the names of Leigh Hunt (1784-1859), Thomas Moore (1779-1852), and Landor (1775-1864). Among the earlier writers of fiction there were several women of note, such as Maria Edgeworth (1767-1849), and Jane Austen (1775-1817). The greatest name in fiction was unquestionably that of Scott. Other prose writers were Mackintosh, Malthus, Hallam, James Mill, Southey, Robert Hall, John Foster, Thomas Chalmers, Hannah More, Cobbett, William Hazlitt, Sydney Smith, Francis Jeffrey, Lord Brougham. In the literature after 1830 poetry included as its chief names Praed, Hood, Aytoun, Lord Houghton, Sidney Dobell, Alexander Smith, Philip James Bailey, William Allington, Elizabeth Barrett Browning, Coventry Patmore, Lord Lytton, ("Owen Meredith"), Arthur Hugh Clough, Edwin Arnold, Matthew Arnold, Dante G. Rossetti, William Morris, Lewis Morris, Swinburne, William Watson, Kipling, and last and greatest, Tennyson and Browning. A brilliant list of novelists for the same period includes Marryat, Lord Lytton, Ainsworth, Benjamin Disraeli (Earl of Beaconsfield), Dickens, Thackeray, Charles and Henry Kingsley, Charlotte Brontë, Lover, Lever, Wilkie Collins, George Macdonald, Charles Reade, George Eliot, Anthony and Augustus Trollope, William Black, Thomas Hardy, R. D. Blackmore, George Meredith, Conan Doyle, Hall Caine, Robert Louis Stevenson, Miss Braddon, Mrs. Craik (Miss Mulock), Mrs. Oliphant, Miss Yonge, Miss Thackeray, Mrs. Humphry Ward, J. M. Barrie, Anthony Hope Hawkins, and others. To the historical and biographical list belong Alison, Macaulay, Buckle, Carlyle, Grote, Milman, Froude, Lecky, S. R. Gardiner, Kinglake, John Richard Green, E. A. Freeman, Charles Knight, Dean Stanley, David Masson, John Morley, Leslie Stephen, Justin McCarthy. Prominent among the theological writers were Dr. Newman, Whately, Augustus and Julius Hare, Trench, Stanley, Maurice,

Hamilton, Alford, F. W. Robertson, Stopford Brooke, Liddon, Isaac Taylor, Jowett, James Martineau, Tulloch, Henry Drummond, and Caird. In science and philosophy among the chief writers have been Whewell, Sir W. Hamilton, Mansel, John Stuart Mill, Alexander Bain, Hugh Miller, Charles Darwin, Huxley, Tyndall, Max Müller, Herbert Spencer, T. H. Green, Sir William Thomson. Of the other prose writers of importance the chief are: De Quincey, Harriet Martineau, Sir Arthur Helps, Ruskin, Matthew Arnold, W. E. Gladstone. A large number of writers of American and colonial birth were added to the native contributors to English literature in its widest sense. Among the English novelists whose work is notable in the twentieth century are Maurice Hewlett, John Galsworthy, Hugh Walpole, D. H. Lawrence, J. D. Beresford, Compton MacKenzie, Clemence Dane, W. B. Maxwell, Gilbert Cannan, Stephen McKenna, and W. L. George.

ENGRAVING, the art of cutting or incising designs on metal plates or blocks of wood, for the purpose of printing impressions from them with ink on paper, or other similar substance. Works of this sort belong to two classes: engravings on metal, in which the lines to be printed are sunk or incised, and engravings on wood, in which the lines to be printed appear in relief, the wood between them being cut away. In the former, the plate having been inked and wiped on the surface, retains the ink only in its hollowed lines, from which it is conveyed to the paper by the pressure of the printing press; in the latter, only the elevated portion of the surface of the block is inked by means of a roller, and, being subjected to the press, it prints as a raised type.

Engraving on Metal.—The metal most commonly used for engraving has been copper; but during the 19th century steel was largely employed on account of its hardness. Steel is less readily engraved than copper, and yields a less free and artistic result; but as the surfaces of copper plates can now be protected by an extremely thin coating of steel deposited by galvanic action, which can be renewed as often as is necessary, they are enabled to yield a large number of excellent impressions without being worn. Zinc plates have also been employed to some extent for etchings. The earliest of the impressions taken from engraved plates are those most valued by connoisseurs, on account of their sharpness, clearness, and richness, qualities which are gradually lost as the surface of the metal becomes worn by repeated printing. The term "working proofs" indicates trial impressions printed by engravers for their own use, to test the state of their work during its progress. "Artist's proofs" are those bearing the signature of the painter or engraver, or both. "Proofs before letters" are those thrown off before the printed titling, etc., has been added; and "open letter proofs" are those in which the letters of the title have been added merely in outline.

Line Engraving.—The practice of line engraving originated with the early Italian goldsmiths, who in this manner were accustomed to take proofs of the metal objects which they decorated with engraved designs, in order to test the progress of their work; and these *nielli*, or highly decorated plates of metal, in which the incised lines or patterns were to be filled with a black composition, are regarded as the earliest engravings. A *pax* or metal plate used in the Roman ritual to receive the kiss of peace, executed by Maso Finiguerra, in 1452, for the Church of San Giovanni in Florence, is considered to have been the first metal from which impressions on paper are known to have been taken.

Etching.—In this process a polished metal plate is coated with a thin transparent surface or "ground," impervious to acid. A mixture of white wax, gum-mastic and asphaltum made into the form of a ball and covered with silk is applied to the heated surface of the plate, and melting exudes through the cloth, when it is spread evenly over the metal by means of a pad of cotton-wool covered with silk, termed a "dabber." The plate is then exposed to the smoke of wax tapers till it becomes of a uniform black, which enables the etched line, disclosing the shining metal, to be visible on its surface. On this plate, so prepared, the design is drawn with an "etching needle," a sharp steel point fitted in a handle, and held like a pencil in the artist's hand. This needle discloses lines of the bare metal ready to be eaten or etched by the acid. The back of the plate having been protected by an application of Brunswick black, it is placed in the "acid bath," a flat tray filled with a mordant, usually composed of nitric acid diluted with an equal volume of water, which attacks and corrodes the metal in the lines that have been exposed to its action by the needle. After sufficient time has been allowed for the palest lines of the subject to be bitten, the plate is removed from the bath; these lines are covered with a "stopping-out varnish" of Brunswick black, applied with a brush, which protects them from further action of the

acid; and the plate is returned to the bath, which attacks the lines still exposed. This process is repeated as often as necessary to produce the desired variety in depth of the various lines of the design. When the biting is completed, the plate is finally removed from the bath, the "ground" is cleaned off with turpentine, and the design appears incised on the metal. The plate is then inked and printed. Various methods of etching, and modifications of the process described have been introduced. Seymour Haden and James McN. Whistler stand at the head of the painter-etchers in England. Alphonse Legros and Hubert Herkomer have also done much to stimulate interest in the art. Among the younger painter-etchers are William Strang, Frank Short, and R. W. Macbeth. Among the most talented of modern etchers in America may be named Frank Duveneck, Otto Bacher, Henry Farrer, Joseph Pennell, Stephen Parrish, Mary Nimmo Moran, Thomas Moran, Swain Gifford, and Charles A. Platt.

Mezzotint Engraving.—This method differs from all other processes of metal engraving in that, while other engravers work from light to shade, and each line which they draw prints as a dark, the mezzotinter works from dark to light, and each touch which he adds to his plate prints as a light. Mezzotint plates are prepared by the action of a kind of chisel, termed a "cradle" or "rocking tool," which passing over the surface roughens it, raising a "bur" of innumerable small metal points, so that if the plate were then inked and printed it would yield an impression of a uniform black. The engraver, having traced his subject on the plate, proceeds to smooth the surface by removing the "bur" with a scraper, in proportion as he wishes to introduce light into his design; the bur being left untouched in the darkest shadows, partially removed in the half-lights, and wholly cleaned away in the high lights, in which the surface is perfectly smooth, and brought to a high polish by means of the "burnisher." The process of mezzotint was invented by an amateur, Ludwig von Siegen (1609-1680). Among the mezzotint engravers of England may be mentioned Simon, Pelham, Beard, Miller, Houston, Frye, and Purcell. Noted in America for this art were Thomas B. Welch (1814-1874) and John Sartain (1808-1898).

Aquatint Engraving.—In this process the polished metal plate is covered with a solution of resinous gum dissolved in spirits of wine. The spirit evaporates, leaving the resin deposited in minute granulations on the metal surface. The design is then transferred to the metal and the plate is bitten in a bath of diluted nitrous acid, which corrodes the portions left exposed between the grains of resin. The darkest parts of the design are longest exposed to the action of the mordant, the lighter parts being successively protected by a series of "stoppings-out," consisting of oxide of bismuth and turpentine varnish applied with a brush in a manner similar to that employed in the "stopping-out" of an ordinary etching. The impressions produced resemble those yielded by mezzotint, both processes working by spaces and not by lines. This method is believed to have been invented by Jean-Claude-Richard de Saint-Non (1730-1804).

Chalk or Stipple Engraving. — The metal plate is coated with an ordinary etching ground, and the subject is drawn upon it by means of a succession of small dots produced by the point of the etching-needle. The plate is then bitten in the usual way with the acid, which corrodes the metal at the points uncovered by the needle; and it is afterward finished by dots, applied with the point of the etching-needle or burin on the bare metal. Jean Charles François (1717-1769) is said to have been the first engraver to employ this process.

Mechanical and Photographic Process. —Engraving in recent times has been generally superseded by photographic and mechanical substitutes. The most important of these is known as photogravure or heliogravure. The beauty of the work produced by means of this process in the reproduction of paintings, of drawings in monochrome and of photographs direct from nature, has raised it to a position of great importance. A photo-mechanical process which is much used in the reproduction of the plates of the older engravers and etchers, and in the production of intaglio etched plate-reproductions from pen drawings has been carried to great perfection, some of the work produced by Amand-Durand of Paris being almost equal to the finest original etchings. A positive photograph is taken of the drawing or engraving to be reproduced (*i. e.*, the lines are black, the whites clear glass); this is placed over a copper plate coated with a bituminous varnish, and exposed to the light. Where the lines of the photograph have protected the varnish from the light it remains soluble, but where the light has affected it through the glass it becomes insoluble. The varnish may then be dissolved from the lines and the copper exposed exactly as if the etching point had been used to make the drawing on an etching ground. The plate is then bitten in the usual manner, and finally touched up with the graver.

ENID, a city of Oklahoma, the county-seat of Garfield co. It is on the Atchison, Topeka and Santa Fé, the Chicago, Rock Island and Pacific, and the St. Louis and San Francisco railroads. It is the center of an important agricultural and poultry-raising district. Its industries include the manufacture of flour, lumber, machinery, boilers, brick, steel posts, candy, etc. It is the seat of the Phillips University, St. Francis Institute, College of Fine Arts, a State institution for the feeble-minded, and has a public library, excellent schools, Federal and county buildings, parks and hospitals. Pop. (1910) 13,799; (1920) 16,576.

ENNERY, ADOLPHE PHILIPPE D' (den-ne-rē'), a French dramatist; born in Paris in 1811; began life as a clerk, but later turned to the drama. He subsequently became the master of modern melodrama. During the 50 years of his active life he accumulated a fortune of $1,200,000. His most successful plays include "Taking of Peking"; "Two Orphans"; "Martyrdom"; "The Grace of God," and "Grandmother." He died in Paris, Jan. 26, 1899.

ENNIS, a city of Texas, in Ellis co. It is on the Texas Central and the Texas Midland railroads. It is the center of an important agricultural and stock-raising region and its industries include cotton compresses, cotton gins, cotton-seed oil mills, railroad shops, flour mills, etc. Pop. (1910) 5,669; (1920) 7,224.

ENNISKILLEN, a borough in Ireland, 87 miles W. S. W. of Belfast; famous for the victory, in 1689, of the troops of William III., under Lord Hamilton, over a superior force of James II., under Lord Galmoy. The banners taken in the battle of the Boyne hang in the town hall. The noted regiment of Enniskilleners, or 6th Dragoons, was first instituted from the defenders of the town.

ENNS, a river in Austria, which rises in the Alps of Salzburg, flows N., then E. N. E., then N. N. W., entering Upper Austria ("Above the Enns"), which for 15 miles it separates from Lower Austria ("Below the Enns"), and finally enters the Danube a little below the town of Enns. Total course about 180 miles.

ENSIGN, the flag or colors of a regiment. Also a former rank of commissioned officers in a regiment of infantry, by the senior of whom the regimental ensigns or colors are carried. The name is now abolished, the title of 2d lieutenant being substituted for it. In the navy, the national ensign consists of a red-and-white striped flag, 13 stripes, with blue field in upper inside corner containing a silver star for each State of the Union. Carried by all American vessels except yachts, which have an ensign of their own. Also the title of the lowest grade of commissioned officers in the United States navy.

ENTENTE CORDIALE (on-tont' kor-di-äl'), a cordial understanding, or friendly disposition and relations, between the governments of two or more countries.

ENTENTE NATIONS. Those governments which were allied against the central European states in the war of 1914-1918. The Triple Entente consisted of France, England, and Russia. The circumstances of the war early forced Belgium to become a member and in 1915 Italy joined the group. Servia, Roumania, and Montenegro were the Balkan states which became allies. Japan was an early ally, but the United States, while actively participating in the struggle, never was a member of the Entente.

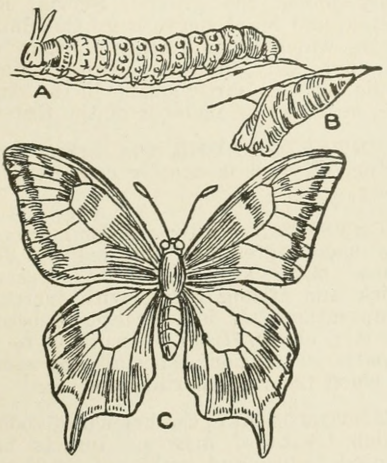
ENTERIC FEVER, the correct designation of what is usually called typhoid fever.

ENTERITIS (-ī'tis), inflammation of the small intestines, marked by diarrhœa, pain, aggravated on pressure, quick and strong pulse, with increased temperature. It is very apt to become chronic, chiefly from obstruction to the hepatic circulation, especially by escape of blood from the portal vein.

ENTOMOLOGY, the branch of zoölogy which treats of insects. Insects have jointed bodies and limbs, an enveloping cuticle of chitin, a ventral chain of ganglia, a dorsal brain, and breathe by air-tubes or tracheæ. Contrasted with peripatus and myriopods, they have made two great steps of progress; the body is centralized, with locomotor limbs reduced to three pairs, and all the typical average forms have wings. Insects frequently have a metamorphosis in their life history. The adult body is divided into (1) a head, with three pairs of appendages (=legs), plus a pair of preoral outgrowths, the antennæ or feelers; (2) a thorax, with three pairs of jointed legs, typically plus two pairs of dorsal, compressed sacs—the wings; (3) an abdomen, without legs, except in so far as these are rudimentarily represented in stings, ovipositors, etc. Insects exceed in number all other animals taken together. Over 80,000 species of beetles or coleoptera and about 15,000 moths and butterflies have been recorded; and Speyer estimates the total census at 200,000.

Form.—The body of an insect consists of a distinct undivided head, probably composed of four obscured segments, of a thorax with three divisions (pro, meso, and metathorax), and of an abdomen typically with 11 rings.

Appendages.—The jointed feelers or antennæ, which are outgrowths of the head, not strictly comparable to legs, have often numerous nerve-endings and seem to be used in smelling, as organs of touch and guidance or in communicating impressions to friends. Exactly comparable with legs are the three pairs of mouth appendages, projecting downward or forward from the head, to which they are jointed and from which they are worked by muscles. The first pair, the mandibles (biting and chewing organs), more or less reduced in those insects



ENTOMOLOGY—SWALLOW-TAIL BUTTERFLY
A. Larva B. Pupa
C. Butterfly

which suck, have but one joint and are without the lateral "palp" present in the crustacean organs of the same name. Next come the first pair of maxillæ, which have jointed "palps." The second pair of maxillæ, are united at their base, and form the so-called labium, also provided with "palps." In the different orders, and in association with the diverse diet, these three pairs of mouth organs vary greatly.

Wings.—The adult insect usually bears two pairs of dorsal outgrowths or wings on the two posterior rings of the thorax. They are undeveloped in some passive females and are likewise absent from many parasitic forms. In these cases the wings have been lost, while they have never been attained by the lowest insects. When at rest the wings are usually folded in various ways, the dragon flies and some others keep them expanded. The two pairs may be almost alike, as in bees and butterflies; those in front may be merely covers for the hind pair, as in beetles, or contorted rudiments in the little bee-parasites (*Strepsiptera*); the hind pair may be linked to the fore pair, and are rudimentary "balancers" or "halters" in flies. They are often hairy or scaly, or gorgeous with pigment, or occasionally odoriferous.

Locomotion.—Insects are emphatically locomotor animals. They walk, run and jump with the quadrupeds; they fly with the birds, they glide with the serpents; and they swim with the fish. Even the limbless larvæ of many forms move deftly, contracting their bodies, and utilizing jaws, hairs, and tubercles to help them along. The limbed larvæ, and especially the true caterpillars, often move with great rapidity; a few jump, and many climb; others utilize their silken threads in spiderlike fashion; while the young dragon flies propel themselves along by the forcible expulsion of water.

Skin.—Insects have a firm chitinous cuticle formed from the epidermis or hypodermis. The cuticle bears scales, tubercles and hairs, of which the last are sometimes olfactory or otherwise sensory. In spite of the ensheathing armature there are often glands in connection with the skin. Before the full size is reached there are often numerous skin-castings or moltings.

Sense-organs. — Except in fleas, lice, and the lowly *Collembola*, adult insects have compound eyes. These are often associated with simple eyes or *ocelli*, which are all that ever appear in larvæ, or fleas, and such insects. Blind insects also occur with other blind animals in the darkness of caves. Auditory organs are represented in almost all orders by peculiar nerve-endings superficially disposed on various parts of the body. On the tactile antennæ, and probably also on the maxillary palps of various insects, there are specially innervated skin cells and hairs believed to be olfactory in function; while others more within the mouth are credited with gustatory sensitiveness. The intelligence is greatest in the social insects—especially the ants and bees, where it is associated with complex though very small brains.

Alimentary System.—The alimentary canal always consists of fore-, mid-, and hind-gut. But the length and structure vary in different insects, to some extent in association with the differences of diet. The fore-gut includes mouth, pharynx, and gullet, of which the gullet may be swollen into a crop, or bear an appended pouch (so-called sucking stom-

ach), or may be continued into a gizzard with hard grinding plates. The mid-gut is glandular, digestive, and absorptive; it often bears sacular outgrowths or glandular cæca, and has, as its origin implies, no chitinous lining. The hind-gut is often coiled, terminally expanded in the rectum, and in that region sometimes associated with glands.

Respiratory System. — Insects when resting often show panting movements in the abdomen, which is swayed by muscles whose activity is the chief condition of the circulation of air throughout the body. For in all insects the whole body is penetrated by air-tubes or tracheæ, which send fine branches into all the organs and tissues. These tubes are really ingrowths from the skin, and are lined by chitin, raised in what appear to be spiral thickenings which keep them elastically tense. In most cases these tracheæ open to the exterior by paired apertures or stigmata on the breast and abdomen, often guarded by hairs and very variously disposed. There are never more than 10 pairs of openings, though primitively there was probably a pair to each segment.

Many insects produce sounds which often express a variety of emotions. In some cases, when not simply automatic, these sounds serve the purpose of love songs; they may also express fear, anger, or even sorrow, or they may give alarm and convey tidings.

Circulatory System. — As the tissues are riddled with air-tubes, the need for definite blood-vessels is greatly lessened, and so the circulatory system is slightly developed in comparison with the thorough respiratory arrangements. The blood—which is colorless, yellow, greenish, or even reddish, with amœboid cells —flows for the most part along lacunæ without definite walls. The central organ is the dorsal blood-vessel or heart.

Metamorphosis.—From the egg-shell of such insects as butterflies, beetles, flies, and bees, there emerges a larva (maggot, grub, or caterpillar) which lives a life of its own, growing, resting, and molting, often very active in its movements and voracious. Having accumulated a rich store of reserve food in its fat-body, the larva becomes for a longer time more or less quiescent, becomes a pupa, nymph, or chrysalis. In this stage, often within the shelter of a spun cocoon, great transformations occur: wings bud out, appendages of the adult pattern appear, reconstruction and centralization of organs are effected; and, finally, out of the pupal husk there emerges an imago or miniature fully-formed insect.

The Internal Metamorphosis. — In those forms which have no metamorphosis, or only an incomplete one, the organs of the larva develop continuously into those of the adult. It is otherwise in the complete metamorphosis of the higher insects. There the internal changes are as marked as the external; there is a gradual reconstruction of organs during the later larval, especially during the pupal stages. Most of the larval organs are absorbed by amœboid cells, and their débris is utilized in building up new structures.

General Life.—(a) While insects are predominantly active animals, we find in contrasting the families abundant illustration of the antithesis between activity and passivity. (b) In the majority of cases the adult insect is short-lived, and dies within a year; an adult *Ephemerid* may be literally the fly of a day, but from this there are many graduations leading up to the rare cases of a queen-bee five years old, or an aged queen ant of thirteen. (c) Reproduction in a great number of insects of both sexes is shortly followed by death, love being in such cases at once the climax and end of life.

Economic Import.—As far as insects are concerned, the struggle between man and animals is by no means finished. Direct injuries to man's person are familiarly illustrated in the parasitism of fleas, lice, and other more or less intimate "boarders"; but these are less important than the share the mosquito seems to have in the loathsome disease *Elephantiasis arabum.* Personal injuries are dwarfed when we think of those done to property, and especially to crops and herds, by voracious or by parasitic insects. Clothes-moth and furniture-borer, vine-insects and Colorado beetle, the botflies which attack sheep, cattle, and horses are familiar illustrations of formidable pests. It should also be noted how the hostile insects which infest forest trees and vegetation generally may occasion changes which have far-off effects on the fauna, scenery, and even climate of a countryside. The majority of plants are dependent on insects, as the unconscious bearers of the pollen essential to the normal cross-fertilization of flowers.

Plants and Insects.—Many insects injure plants without any compensating benefit, and in this connection there are numerous cases in which plants and insects (especially ants) form a mutual partnership. Such plants are saved by their bodyguard of ants from unwelcome visitors, and the benefit is sometimes returned by the growth of special shelters, tenanted by the partner-insects.

ENTRE DOURO E MINHO (en'tre dō'rō ā mēn'yō), or **MINHO**, a province of Portugal, in the extreme N. W. of the country, bounded on the N. by the Minho river, and on the S. by the Douro river. It has been called the Paradise of Portugal. The climate is agreeable and healthy. The chief productions are wine, oil, flax, maize, wheat, barley, oats, and vegetables. Wine is shipped largely at Oporto, the capital. Along the coast are numerous fisheries, at which great numbers find employment. The province of Minho consists of three districts, Braga, Vianna, and Oporto. Pop. about 1,300,000.

ENTRE RIOS (en'trā rē'ōs) ("between rivers"), a province of the Argentine Republic, between the Paraná and the Uruguay rivers. Estimated area, 29,021 square miles: pop. about 430,000. The country is chiefly pastoral, but an increasing proportion is being put under cultivation, about 300,000 acres being now devoted to maize and wheat. The province is fertile, and well watered, being subject, in the S., to annual floods; nevertheless, the climate is very healthy. Lime and gypsum are worked. The province has about 500 miles of railway. The capital is Paraná.

ENVER PASHA, a Turkish soldier and politician. He was the chief and most influential leader in the Committee of Union and Progress, and with its advent into power through the revolution which overthrew Abdul Hamid, he began to take a prominent part in the political life of the Turkish nation. Immediately after the success of the Young Turk party he was sent to Berlin as the military attaché of the Turkish Embassy, and it is believed that it was through him personally that the understanding between Turkey and Germany was developed which led the Turks to throw their lot in with the Central Empires during the World War shortly after hostilities began. Enver Pasha was the most able assistant of General Liman von Sanders in the reorganization of the Turkish Army. After the collapse of the Turkish Government, in 1918, he fled to Germany. In January, 1920, he was reported to be back in Asiatic Turkey, where he raised the flag of revolt against the Government established by the Allies in Constantinople. Believing that he had the moral support of the whole Mohammedan world, especially in India, he demanded a revision of that clause of the Paris Treaty which proposed the partition of Turkey, his followers being known as the Nationalists. See TURKEY.

EOCENE (ē'ō-sēn), in geology, a term applied to the lower division of the Tertiary strata. The Eocene beds are arranged in two groups, termed the Lower and Upper Eocene; the strata formerly called Upper Eocene being now known as Oligocene. They consist of marls, limestones, clays, and sandstones, and are found in the Isle of Wight and in the S. E. of England, and N. W. of France, in central Europe, western Asia, northern Africa, and the Atlantic coast of North America.



ENVER PASHA

EOLUS (ē'ō-lus), in Roman mythology, god of the winds.

EPAMINONDAS, an ancient Greek hero, who, for a time, raised his country, Thebes, to the summit of power and prosperity. He was born about 418 B. C. He led in the struggle during which Spartan supremacy in Greece was destroyed, and the supremacy of Thebes temporarily secured. Four times he successfully invaded the Peloponnesus, at the head of the Thebans, but after his death Thebes soon sank to her former secondary condition. He was distinguished for the friendship subsisting between him and Pelopidas, with whom he served in the Spartan campaign 385 B. C. His virtues have been praised by both Xenophon and Plutarch. He was killed at the battle of Mantineia 362 B. C.

ÉPÉE (e-pā'), **CHARLES MICHEL, ABBÉ DE L'**, instructor of the deaf and dumb; born in Versailles, France, Nov. 25, 1712. Taking orders, he became a preacher and canon at Troyes, but later

lived in retirement in Paris. In 1765 he first began to occupy himself with the education of two deaf and dumb sisters; and invented a language of signs, by which persons thus afflicted might be enabled to hold intercourse with their fellow-creatures. At his own expense he founded an institution for the deaf and dumb, which was first publicly examined in 1771, and from 1778 received an annual subsidy. He died in 1789.

ÉPERNAY, capital of an arrondissement, in the department of the Marne, on both banks of the river Marne, about 12 miles S. from the city of Rheims. It is the center of a rich champagne wine producing district. Important railroad shops are located there. The population before the World War was about 21,000. It was captured by the Germans during the first German advance toward Paris, after the beginning of military operations, in August, 1914, and held by them until, driven back during the battles of the Marne, their lines were established from ten to fifteen miles to the northward.

EPHEMERIS, in astronomy, a table giving the position of a heavenly body from day to day, so that observers may know where to find it. The name is also applied to an astronomical almanac containing a collection of such tables.

EPHESIANS, THE EPISTLE TO THE, a canonical epistle addressed by the Apostle Paul to the Church which he had founded at Ephesus. It was written during his first captivity at Rome, immediately after he had written the Epistle to the Colossians (A. D. 62), and was sent by the hands of Tychicus, who also bore the message to the Church at Colossæ.

EPHESUS (ef'e-sus), a famous city of Asia Minor, now in ruins, about 38 miles S. S. E. of Smyrna. It was the ancient capital of Ionia, and had one of the seven Christian Churches founded by the apostles. Its temple, dedicated to Diana, was considered one of the seven wonders of the world. Its dimensions were 425 feet long and 200 broad. The roof was supported by 127 columns, 60 feet high, which had been placed there by as many kings. Of these, 36 were carved in the most beautiful manner, one of which was the work of the famous Scopas. This celebrated building was not completed till 220 years after its foundation. Ctesephon was its principal architect. The riches which were in the temple were immense, and the goddess who presided over it was worshiped with the most awful solemnity. It was burnt on the night that Alexander was born, but soon after it rose from its ruins with greater splendor and magnificence.

EPHESUS, COUNCILS OF, two ecclesiastical assemblies held at Ephesus. The first was the third ecumenical council, summoned by Emperor Theodosius II., in 431, to settle a complicated controversy, involving among other things the fate of NESTORIUS (*q. v.*), Bishop of Constantinople. The second was the so-called "robber synod," convened by Theodosius (449), to consider again the case of Nestorius. In the proceedings of this council no opposition to the will of the president, Dioscurus, Bishop of Alexandria, was allowed; the bishops were overawed by monks, soldiers, and brawny servants, and were compelled to sign blank papers, to be filled up as the leaders chose. These lawless methods, as well as the violent measures carried through by their aid, hastened a crisis in the Eastern Church, and greatly furthered the advancing power of the Bishop of Rome, by compelling an appeal to him against oppression and wrong.

EPHRAIM, the younger son of Joseph, and the founder of one of the 12 tribes of Israel. When the Israelites left Egypt the Ephraimites numbered 40,500, and their possessions in the very center of Palestine included most of what was afterward called Samaria.

EPIC, a poem which narrates the history, real or fictitious, of some notable action or achievement, or series of actions or achievements, accomplished by some distinguished hero. The most celebrated epic poems are in Greek literature, the "Iliad" and "Odyssey" of Homer; in Latin, the "Ænid of Vergil"; and in English, the "Paradise Lost" of Milton.

EPICTETUS (ep-ik-tē'tus), a Greek Stoic philosopher; born in Hierapolis, Phrygia, about A. D. 50. A slave and then a freed-man at Rome where he taught philosophy there till 94, when all philosophers were banished by Domitian; he apparently returned later and lived into Hadrian's reign. The essential tenets of Stoicism are nowhere more clearly or feelingly set forth than by him. No writings of his are known; but his maxims were gathered and published in the "Encheiridion," or handbook, and the "Commentaries."

EPICURUS (ep-i-kū'rus), a famous Grecian philosopher; lived from about 341 B. C. to 270 B. C. He was a teacher of philosophy rather as a rule of life than as a system of knowledge, and began to teach when he was about 32 years old,

first at Mitylene, then at Lampsacus; but his great school was at Athens, where he settled about 305 B. C. According to him the supreme good of life is found in pleasure, but not in the momentary gratification of sense, rather in the delight inseparable from the practice of virtue. The Epicurean doctrines were in time misinterpreted and misunderstood, and Epicureanism became a synonym of self-indulgent and sensuous pleasure.

EPIDEMIC, a disease which attacks many persons at the same time at different places, spreading with great rapidity, extremely virulent and fatal at the first onset, gradually becoming spent and feeble, so that the early cases are usually the worst. The plague, cholera, smallpox, and influenza are epidemics, and other infectious diseases are among the number.

EPIDERMIS, in human anatomy, the cuticle or scarf-skin constituting the external layer of the skin, and protecting the inner ones. It is thickest in the palms of the hands and the soles of the feet, where the skin is much exposed to pressure. In comparative anatomy, a somewhat similar cuticle in several animals; also a layer of animal matter covering the shells of mollusks. In botany, the true skin of a plant below the cuticle; also the general integument as a whole, divided into cuticle and derma.

EPIGLOTTIS, a cartilaginous valve which partly closes the aperture of the larynx.

EPIGRAM, a short poem of a pointed or antithetical character, or any short composition expressed neatly and happily or antithetically. Epigram was the name given by the Greeks to a poetic inscription on a public monument, and hence the word came parsed into its modern signification. Of the Roman poets, Catullus and Martial are most celebrated for their epigrams. In cookery, epigrams of mutton, veal, etc., are small cutlets of mutton, veal, etc., dressed in a particular manner.

EPILEPSY, falling sickness. It derives its name, epilepsia, from the suddenness of the attack. The leading symptoms are a temporary suspension of consciousness, with a recurring clonic spasm. Epilepsy may be caused by fear, passion, etc., or by a blow operating on the brain; it is often associated with idiocy and the puerperal state. There is little hope of cure.

EPILEPTIC COLONIES, establishments modeled on farms in which epileptics inhabit houses surrounded by open spaces such as gardens and meadows, and supplemented by factories, schools, theaters, and churches; giving the patients occupation and a diversion, and the opportunity of a life spent largely in the open. The idea is a modern one and has been fruitful of results. It was first conceived in Germany and the epileptic colony at Bielefeld, in Westphalia, the best known of its kind, provides with the officials and employes for about 4,000 persons. Both sexes are accommodated, and the tabulated results show that less than 1 per cent. of the patients have been allowed to develop insanity. Nearly 10 per cent. are discharged as cured; over 20 per cent. improve sufficiently to leave for ordinary duties; 21 per cent. show no sign of improvement; and 20 per cent. are released by death. Epileptic colonies, modeled on that of Bielefeld, have been established in different parts of Europe. There are several in Germany, one in Holland, one in Italy, and one in Switzerland. The English established colonies at Chalfont St. Peter in 1894, and another at Warford, Cheshire, in 1900. The results have been similar to those noted at Bielefeld. The principles that lay at the basis of the treatment of epileptics in Germany had long received favorable consideration in the United States, and in course of time several States established farm colonies of a similar character. There are now such colonies in New York, Virginia, Indiana, Michigan, New Jersey, and other States. The colony at Sonyea, N. Y., was opened in 1896, covering something like 2,000 acres, with gardens, orchards, woods, meadows, parks and numerous groups of buildings, including mills, residences, churches, libraries, schools, shops, and barns, and the available means for many industries. The average attendance is about 1,500. The census of 1912 showed 745 males, 673 females, of whom 130 males and 97 females were admitted during the previous year, 146 males and 83 females being discharged, transferred or died, 4 recovering.

EPILOGUE, the closing speech or short poem addressed to the audience at the end of a play. The epilogue, is the opposite of the prologue, or opening address.

ÉPINAL, chief town of the department of the Vosges, France, situated at the W. base of the Vosges Mountains, on both banks of the Moselle, and about 260 miles E. S. E. from Paris. It was in this region that the French forces attempted to launch an offensive against the Germans in Alsace-Lorraine, shortly after the beginning of the World War, in August, 1914, but were strongly re-

pulsed. The French were able to hold their lines just E. of Epinal. Pop. about 30,000.

EPIPHANY (-pif'a-ni), a Church festival, observed on Jan. 6 in honor of the adoration of our Saviour by the three magi, or wise men, who came to adore Him and bring Him presents, led by the star. As a separate festival it dates from 813.

EPIRUS (-pī'rus), a province of ancient Greece, now forming the S. part of Albania. It was separated from Grecian Illyria by the Ceraunian Mountains, and by the famous river Pindus from Thessaly. The river Acheron, also famous in mythological story, flowed through its limits. Here were also the celebrated temple and sacred grove of Dodona. Pyrrhus, King of Macedon, was a native of Epirus, which country passed successively into the hands of the Romans and the Turks. It was ceded to Greece by the Turks in 1881.

EPISCOPAL CHURCH. See PROTESTANT EPISCOPAL CHURCH; REFORMED EPISCOPAL CHURCH.

EPITAPH, an inscription on a tomb or monument in honor or memory of the dead. Epitaphs were in use both among the Greeks and Romans. The Greeks distinguished by epitaphs only their illustrious men. Among the Romans they became a family institution, and private names were regularly recorded on tombstones. The same practice has generally prevailed in Christian countries.

EPIZOÖTIC, or **EPIZOÖTIC DISEASE**, a disease that at some particular time and place attacks great numbers of the lower animals, just as an epidemic attacks man. Pleuro-pneumonia is often an epizoötic, as was also the rinderpest. See EPIDEMIC.

EPOCH, in ordinary language, a point of time from which a new computation of years is begun. Technical uses:

History.—A point of time in which an event of such importance takes place that its influence is powerfully felt in all succeeding time.

Geology.—The term is sometimes used for period, as the Tertiary epoch; this sense of the word is loose and objectionable, as the term epoch more properly refers to the moment at which a new space of time commences than to its whole duration.

Astronomy.—The longitude which a planet has at any given moment of time. To predict this for any future period the longitude at a certain instant in the past must be known; that instant is the epoch of the planet, which is an abbreviation for its longitude at that epoch.

An epoch and an era are different. Both mark important events, but an era is an epoch which is chronologically dated from; an epoch is not marked in this way. The birth of Christ and the Reformation were both of them highly important epochs in the history of mankind; the former, the inconceivably greater event of the two, gave rise to the Christian era; but the Protestant nations and Churches do not any of them reckon time from the Reformation. The birth of Christ was, therefore, both an epoch and an era, the Reformation an epoch only.

EPSOM, a town in the county of Surrey, England, 15 miles S. W. of London, formerly celebrated for a mineral spring, from the water of which the well-known Epsom salts were manufactured. The principal attraction Epsom can now boast of is the grand race meeting held on the Downs, the chief races being the Derby and Oaks.

EPSOM SALT, sulphate of magnesium ($Mg\ SO_4\ 7H_2O$), a cathartic salt which appears in capillary fibers or acicular crystals. It is found covering crevices of rocks, in mineral springs, etc.; but is commonly prepared by artificial processes from magnesian limestone by treating it with sulphuric acid, or by dissolving the mineral kieserite ($Mg\ SO_4\ H_2O$) in boiling water, allowing the insoluble matter to settle, and crystallizing out the Epsom salt from the clear solution. It is employed in medicine as a purgative, and in the arts. See EPSOM.

EPSTEIN, JACOB, an American sculptor. He was born in New York, 1880, and was educated in the New York public schools. He then took up sculpture and after producing several minor works was commissioned in 1907 to execute eighteen figures to decorate the recently erected building of the British Medical Association in London. The work, with the strongly marked anatomy of the figures, aroused much adverse criticism, though it had its defenders. In 1909 he was commissioned to execute the tomb of Oscar Wilde for the Père Lachaise Cemetery, Paris; the tomb was carved out of Derbyshire marble. Later he decorated the Church Square, Pretoria, and in 1919 his figure of Christ caused much comment.

EPWORTH LEAGUE, a society of young people of the Methodist Episcopal Church; formed May 15, 1889, in Cleveland, O., by the union of five societies affiliated with the Methodist Church. It adopted as its motto: "Look up, Lift up," and its declared object is to "promote intelligent and loyal piety in the young

members and friends of the Church; to aid them in the attainment of purity of heart and constant growth in grace and to train them in works of mercy and help." The league is governed by a board of control, appointed by the bishops, and consisting of one bishop, who is President, and one member for each General Conference District. The general secretary, the assistant-general secretaries for the German and colored conferences, and the editor of the "Epworth Herald" are advisory members. From the United States the league extended to Japan, China, India, Norway, Sweden, the Philippines, Burma, Mexico, South America, Denmark, Finland, Bulgaria, and other countries. In 1920 there were 30,000 chapters enrolled, with over 2,000,000 members.

EQUATION, a term based on the idea of equality.

Algebra.—Two algebraic expressions which are equal to one another, and are connected by the sign=. Thus

$$6x—13=2w+19.$$

is an equation; and, since the equality of the members depends on the value assigned to x, it is called an equation of condition. The two quantities separated by the sign= are called the members of the equation; the quantity to the left of= being the first member, and that to the right the second. The quantities separated by the signs + and — are called the terms of the equation. Of the quantities some are known and the others unknown. The known quantities are generally represented by numbers. If letters be used, then those employed are generally *a*, *b*, *c*, *d*, etc.—*i. e.*, letters at or near the beginning of the alphabet. Unknown quantities are represented by letters toward the conclusion of the alphabet. If there be one unknown quantity it is generaly represented by x; if two, by x and y; and if three, by x, y, and z. Sometimes a statement that two expressions are equal for all numerical values that can be assigned to the letters involved, provided that the same value be given to the same letter in each member, *e. g.*—

$$(x \pm a)^2=x^2 \pm 2ax+a^2.$$

Such a statement is called an identical equation, or briefly, an identity. The solution of an equation is the process which ultimately results in discovering and stating the value of the unknown quantity, which value is the root of the equation. Equations are classified according to the highest power of the unknown quantity sought. When that quantity exists only in the first power we have a simple equation, or one of the first degree; if there be a square or second power of the unknown quantity, the equation becomes a quadratic, or one of the second degree; if the third power be present a cubic equation, or of the third degree. It is rarely that a higher power than the cube of the unknown quantity has to be dealt with. When such cases occur the equation is biquadratic, or one of the fourth degree, an equation of the fifth, of the sixth, of any degree.

Astronomy.—Any sum to be added or subtracted to allow for an anomaly or a special circumstance affecting the exactness of a calculation. If, for instance, the orbit of a planet were calculated on the supposition that its orbit was circular when in reality it is elliptical a small number would require to be added or subtracted to make the calculations accurate. That small sum would be the astronomical equation. If the movements of the planets calculated on the supposition that the only attraction operating on them is that of the sun, error, though not of a considerable magnitude, will be the result. There is a mutual attraction among all the planets; each is capable of producing a perturbation in the orbits of all the rest. An equation is required for every such perturbation before it is possible to calculate accurately the course of the planet.

Chemistry.—A chemical equation represents symbolically a chemical reaction, the symbols of the reacting substances being placed on the left hand, and the symbols of the new substances formed by the reaction being placed on the right hand. In a chemical equation the number of atoms of each element must be the same on each side of the equation, thus, $3AgNO_3+Na_2HPO_4=Ag_3PO_4+2NaNO_3+HNO_3$. Three molecules of argentic nitrate and one molecule of disodium-hydrogen-phosphate equal (that is, form when added together) one molecule of triargentic phosphate, and two molecules of sodium nitrate, and one molecule of hydrogen nitrate (nitric acid). Chemical equations are imperfect, as they do not show the amount of heat liberated, or absorbed, during the reaction.

Annual, Personal, Etc.—Annual equation, in astronomy, one of the numerous equations requisite in determing the moon's true longitude; equation of the center; the equation required to fix the place or orbit of a planet calculated as if it were moving in a circle when it is doing so really in an ellipse; equation of the equinoxes; the equation required to calculate the real position of the equinoxes from its mean one, the disturbing element being the movement called precession of the equinoxes; equation of time, the difference between mean and apparent time; personal equation,

the difference between the time at which an astronomical occurrence takes place and that at which a fallible observer notes that it does so; also, the correction of personal differences between particular individuals as to exactness in observations with astronomical instruments; equation of payments, a rule for ascertaining at what time a person should in equity pay the whole of a debt contracted in different portions to be repaid at different times.

EQUATOR, an imaginary great circle of the celestial vault or on the surface of the earth.

In Astronomy.—A great circle of the celestial vault at right angles to its axis, and dividing it into a northern and southern hemisphere. It is constituted by the plane of the earth's equator, produced in every direction till it reaches the concave of the celestial sphere. In his progress north and south, and vice versa, the sun is twice a year in the celestial equator—viz., at the EQUINOXES (*q. v.*). The point in the equator which touches the meridian is raised above the true horizon by an arc which is the complement of the latitude. The sun and planets all have equators. They rotate around their several axes, and the plane at right angles in each case is the equator of the heavenly body.

In Geography.—A great circle on the surface of the earth equidistant from its poles, and dividing it into two hemispheres. Its latitude is zero; it is therefore marked on the maps as 0. Other parallels of latitude are counted from it, augmenting in their numerical designation as their distance from it north or south increases, the poles being 90°. The plane of the equator is a plane perpendicular to the earth's axis, and passing through its center.

In Magnetism.—A somewhat irregular line, nearly but not quite a great circle of the earth, in which there is no dip of the magnetic needle. It is hence called also the aclinic line. It is inclined to the equator at an angle of 12°, and cuts it at two points almost exactly opposite to each other, the one in the Atlantic and the other in the Pacific. It is not far from the geographical equator, but its situation slowly alters year by year, there being a slow oscillation of the magnetic poles, while the geographical equator and poles are fixed. The two points in which the magnetic equator cuts the equator seem traveling at present from E. to W.

EQUATORIAL, an astronomical instrument designed to note the course of the stars as they move through the sky. A strong axis is constructed and permanently fixed in a slanting position so as to point exactly to the North pole of the heavens. It turns on its axis, carrying with it a telescope which, if it retained its relative position to that of the revolving portion of the instrument, would enable an observer looking through it to see no more than a single great circle of the sky. It is not, however, fixed to the revolving portion of the instrument, but may be moved up or down so that with it an astronomer can follow the entire course of a circumpolar star in its passage around the sky. It is of importance to ascertain not only the course of a star, but the apparent rapidity of its movement. This end is attained by attaching to the axis of the equatorial a racked wheel in which works an endless screw or worm, the whole put in motion by an apparatus furnished with centrifugal balls, like those of the governor of a steam engine, and which render the motion uniform.

EQUATORIAL CURRENT, a current in the ocean which crosses the Atlantic from Africa to Brazil, having a breadth varying from 160 to 450 nautical miles. Its waters are cooler by 3° or 4° than those of the ocean under the line. Its effect, therefore, is to diminish the heat of the tropics.

EQUATORIAL TELESCOPE, a telescope so mounted as to have a motion in two planes at right angles to each other; one parallel to the axis of the earth, and the other to the equator. Each axis has a graduated circle, one for measuring declination and the other right ascension.

EQUINOCTIAL, the same as the celestial equator. The equinoctial points are those in which the equinoctial and the ecliptic intersect. Equinoctial time is time reckoned from the moment in each year when the sun passes the vernal equinox. This instant is selected as a convenient starting-point of a uniform reckoning of time for the purposes of astronomical observers.

EQUINOCTIAL GALE, a gale popularly supposed to occur at the time of the spring or autumn equinox. Long-continued observations, however, are decisive against this popular belief.

EQUINOX, in astronomy, either one of the two points at which the sun, in its annual apparent course among the stars, crosses the equator; so called because the days and nights are nearly equal when the sun is at these points. The vernal equinox occurs about March 20. When but one equinox is referred to, vernal equinox is meant. The autumnal equinox occurs about Sept. 23.

EQUINOXES, PRECESSION OF THE, the motion of the equinoxes along the ecliptic due to the change in the direction of the earth's axis of rotation, caused by the attraction of the moon and sun on the protuberant equatorial ring of the earth.

EQUITY, in law, the system of supplemental law administered in certain courts, founded on defined rules, recorded precedents, and established principles, the judges, however, liberally expounding and developing them to meet new exigencies. While it aims to assist the defects of the common law, by extending relief to those rights of property which the strict law does not recognize, and by giving more ample and distributive redress than the ordinary tribunals afford, equity by no means either controls, mitigates or supersedes the common law, but rather guides itself by its analogies, and does not assume any power to subvert its doctrines. Courts of equity grant redress to all parties where they have rights, *ex æquo et bono*, and modify and fashion that redress according to circumstances. They bring before them all the parties interested in the subject-matter of the suit, and adjust the rights of all.

ERA. See EPOCH.

ERASED, in heraldry, signifies violently plucked or torn off, and showing a ragged edge; as opposed to couped or cut, which shows a smooth edge. The term is chiefly applied to the heads and limbs of animals.

ERASMUS, DESIDERIUS (-raz'mus), a Dutch scholar; born in Rotterdam in 1467. His original name was Gerard. At the age of 17 he assumed the monastic habit; the Bishop of Cambray delivered him from this constraint. In 1492 he traveled to Paris to perfect himself in theology and polite literature. A rich Englishman there, Lord Mountjoy, pensioned him for life. In 1497 he went to England. He returned soon after to the Continent, took his doctor's degree, was relieved from his monastic vows by dispensation from the Pope, and published several of his works. He returned to England in 1510, resided with Sir Thomas More, and was appointed Margaret Professor of Divinity and Greek Lecturer at Cambridge. In 1514 he returned to the Continent. He rendered great and lasting service to the cause of reviving scholarship. Though he took no direct part in the Reformation, he attacked the disorders of monasticism and superstition. He edited various classics, the first edition of the Greek Testament from MSS. (with Latin translation), etc., but his best known books are the "Praise of Folly," and his "Colloquies." He died in Basel, in 1536.

ERCELDOUNE, THOMAS OF (called the Rhymer, and Learmont), a Scotch poet and seer, who flourished probably between 1220 and 1297, and wrote a poem called "Sir Tristrem." He occupies a very conspicuous position in the annals of Anglo-Saxon literature.

ERCKMANN, ÉMILE (erk'män), a French novelist; born in Pfalzburg, in 1822; studied law, but early developed a taste for literature. In 1847 he formed a literary partnership with Alexandre Chatrian (born Dec. 18, 1826; died Sept. 5, 1890), and later with him published successfully the dramas "The Polish Jew" and "Friend Fritz." But at the height of their financial success the partnership was dissolved through a quarrel. After the separation Erckmann continued to write indefatigably, but his writings were no longer in demand, owing to the lack of advertisment which Chatrian had furnished. He died in Lunéville, March 14, 1899.

EREBUS, MOUNT, an active volcano on Victoria Land, in lat. 78° 10′ S., rising 12,367 feet above the sea. It was discovered in 1841 by Ross, who named it after one of his vessels. Captain R. F. Scott's Antarctic expedition wintered in the vicinity (1901-1904) and Sir E. Shackleton's party made the ascent in 1908.

ERECHTHEUS (ē-rek'thūs), or **ERICHTHONIUS** (e-rik-thō'ni-us), an Attic hero, said to have been the son of Hephæstus and Atthis, daughter of Cranaus, the son-in-law and successor of Cecrops. He was brought up by Athena, who placed him in a chest, which was intrusted to Agraulos, Pandrosos, and Herse, the daughters of Cecrops, with the strict charge that it was not to be opened. Unable to restrain their curiosity, they opened the chest, and discovering a child entwined with serpents, were seized with madness, and threw themselves down the most precipitous part of the Acropolis. Afterward Erechtheus was the chief means of establishing the worship of Athena in Attica. The Erechtheum was erected in his own honor. This original Erechtheum was burned by the Persians, but a new and magnificent Ionic temple was raised on the same site.

ERETRIA (-rē'tri-ä), an ancient Ionic trading and colonizing town on the S. W. coast of Eubœa, which was destroyed by the Persians in 490 B. C., and rebuilt by the Athenians.

ERFURT (er'fört), an important town in the Prussian province of Saxony,

on the river Gera, formerly a fortress with two citadels, now given up as such. It has a fine cathedral dating from the 13th century and several handsome Gothic churches. The university, founded in 1378 and suppressed in 1816, was long an important institution. There are still a Royal Academy of Science and a Royal Library with 60,000 volumes The monastery (now an orphanage) was the residence of Luther from 1501 to 1508. Prior to the World War the industries were varied, including clothing, machinery, leather, shoes, ironmongery, chemicals, etc. The horticulture of the environs enjoyed a high reputation, plants and seed being produced in great quantities. Pop. in 1919, 129,646.

ERIC, the name of several Danish and Swedish kings. Eric VII., King of Denmark; born in 1382, the son of Duke Wratislaw of Pomerania, was selected as her successor by Queen Margaret of Denmark, and in 1412 mounted the throne of Denmark, Norway, and Sweden, united by the treaty of Calmar. Cruel and cowardly in character, he lost Sweden in 1437 through a revolt of the peasants of Dalecarlia, and in 1439 was deposed also in Denmark. He died in Rügenwald in 1459. Eric IX., the Saint, became King of Sweden in 1155, did much to extend Christianity in his dominions, and to improve the laws, and fell in battle with the Danes in 1160. Eric XIV., the last of the name who reigned in Sweden, succeeded in 1560 to the throne of his father, the great Gustavus Vasa, and at once began to exhibit the folly that disgraced his reign. His flighty matrimonial schemes reached even Elizabeth of England, till at length (1567) his roving fancy found rest in the love of a Swedish peasant-girl, who acquired an influence over him which was ascribed by the superstitious to witchcraft. His capricious cruelties and the disastrous wars alienated his subjects, who threw off their allegiance in 1568, and elected his brother John to the throne. In 1577 he ended his miserable life by a cup of poison. His story has been worked into dramatic form by Swedish poets; in German by Kruse in his tragedy, "King Erich" (1871).

ERICA (-rī'kä), the heath, a large genus of branched rigid shrubs, type of the natural order *Ericaceæ*, most of which are natives of south Africa, a few being found in Europe and Asia. The leaves are narrow and rigid, the flowers are globose or tubular, and four-lobed. Five species are found in Great Britain.

ERICSSON, JOHN, an American inventor; born in Langbanshyttan, Sweden, July 31, 1803; entered the Swedish army in 1820; was promoted captain; resigned in 1827. He soon became known as an inventor. In 1828 he made the first application to navigation of the principle of condensing steam and returning the water to the boiler; later he brought out a self-acting gun-lock by means of which naval cannon could be automatically discharged at any elevation without regard to the rolling of the ship. In 1833 he designed a caloric engine; and in 1836 invented the screw propeller, which revolutionized navigation. Ericsson came to the United States in 1839 and two years later built the screw-propelling warship "Princeton" for the government. This vessel was the pioneer of modern naval construction and the foundation of the steam marine of the world. The achievement, however, which made him famous in the United States was the construction in 1861 of the ironclad "Monitor," which arrived in Hampton Roads just in time to defeat, on March 9, 1862, the Confederate ironclad "Merrimac." A fleet of monitors was soon built and did important service during the remainder of the war. Ericsson died in New York City, March 8, 1889. After his remains had been paid marked honor, they were sent back to Sweden on the new cruiser "Baltimore," and interred with imposing ceremonies.

ERIDANUS (ē-rid'a-nus), in Greek legend, the name of the river Po. In astronomy, one of the 15 ancient S. constellations. It winds like a river through the sky from the star of the first magnitude, Achernes, in the constellation Phœnix, past the feet of Cetus, to the star Rigel in Orion.

ERIE, city, port of entry, and county-seat of Erie co., Pa., on Lake Erie, and on the Lake Shore, the Pennsylvania, the Erie, and several other railroads; 85 miles S. W. of Buffalo; 100 miles N. E. of Cleveland. Erie is on a bluff, having a grand view of the lake, is laid out with broad streets at right angles with each other, and has several large and attractive parks. It is lighted with gas and electricity, and has a bountiful supply of water from the lake. The peculiarly advantageous location of Erie has given it high rank as a shipping and manufacturing point. It has the largest land-locked harbor on Lake Erie. The harbor has been greatly improved. Presque Isle, lying directly in front of the city, furnishes means of ample protection; three lighthouses stand at the entrance to the harbor, and substantial wharves, where merchandise is transferred directly from vessels to cars, extend along the entire front. The

principal industries are manufactures of iron, steam engines, machinery, car-wheels, car-work, stoves, engines and boilers, chemicals, blast furnaces, automobiles, flour and grist mill products, brick, leather, organ, pump, furniture, and various kinds of woodwork factories, and petroleum refineries. The leading articles of shipment are lumber, bituminous and semi-bituminous coal, iron ore, petroleum, and manufactured products, and these are conveyed by railroads, steamboats, and sailing vessels that ply regularly between Erie and other ports on the great lakes. Among the notable buildings are the City Hall, Union Depot, Government Building (includes Postoffice, Custom House, and other departments), State Soldiers' and Sailors' Home on Garrison Hill, Hamot Hospital, St. Vincent Hospital, Protestant Home for the Friendless, United States Marine Hospital, and Central School. Near the city is a memorial in the form of a block house, erected by the State, in honor of Anthony Wayne. The city has excellent public schools, a public library, daily and weekly newspapers, 3 National and several savings banks. Erie occupies the site of a French fort, called Fort de la Presque, built in 1753, was laid out as a town in 1795; had a portion incorporated as a borough in 1805; and the whole was given a city charter in 1851. It was the headquarters of Commodore Perry in the War of 1812; the fleet with which he defeated the British in the battle of Put-in-Bay was built and equipped here. Natural gas was discovered in 1889. Pop. (1910) 66,525; (1920) 93,372.

ERIE CANAL, the largest artificial waterway in the United States, serving to connect the great lakes with the sea. It begins at Buffalo on Lake Erie, and extends to the Hudson at Albany. It is 387 miles long; has in all 72 locks; a surface width of 70 feet, bottom width of 42 feet, and depth of 7 feet. It is carried over several large streams on stone aqueducts and was opened in 1825. See NEW YORK STATE BARGE CANAL.

ERIE, LAKE, one of the great chain of North American lakes, between Lakes Huron and Ontario, about 265 miles long, 63½ miles broad at its center, from 200 to 270 feet deep at the deepest part; area, 9,600 square miles. The whole of its S. shore is within the territory of the United States, and its N. within that of Canada. It receives the waters of the upper lakes by Detroit river at its S. W. extremity, and discharges its waters into Lake Ontario by the Niagara river at its N. E. end. The Welland Canal enables vessels to pass from it to Lake Ontario. It is shallow compared with the other lakes of the series, and is subject to violent storms. The principal harbors are those on the United States side—Buffalo, Erie, Cleveland, etc.

ERIE, LAKE, BATTLE OF. In the War of 1812, between the United States and Great Britain, each party tried to gain possession of Lakes Erie and Ontario as a theater for warlike operations. The chief command of the naval force on Lake Ontario was held by Commodore Chauncey, and that on Lake Erie by Master-Commandant Oliver Hazard Perry, of Rhode Island, then only 27 years old. Perry fitted out a squadron of seven vessels at Erie, and succeeded in running the British blockade early in August, 1813. On Sept. 10 following he engaged in a fight in Put-in-Bay, near the W. extremity of the lake, with the British squadron of 6 vessels, mounting 63 guns. A fierce battle was waged for several hours, in the early part of which Perry's flagship, the "Lawrence," was completely disabled and struck her flag. He immediately shifted his flag to the "Niagara," and continued in action, finally defeating the British and establishing American supremacy on the lakes.

ERIGENA, JOANNES SCOTUS (e-rij' e-nä), an eminent scholar and metaphysician; probably born in Ireland about 800-810. He spent a great part of his life at the court of Charles the Bald of France, and was placed at the head of the school of the palace. The king further imposed on him the double task of translating into Latin the Greek works of the pseudo Dionysius the Areopagite, and of composing a treatise against Godeschalc on "Predestination and Free-will." This treatise, and another, "Of the Division of Nature," contained many views in opposition to the teachings of the Church. They were condemned by the councils of Valencia in 855 and of Langres in 859, and Pope Nicholas I. demanded the immediate disgrace of the culprit. He died in France about 875.

ERIN, an old name for Ireland. Now used only in poetry.

ERINYES. The FURIES, *q. v.*

ERIVAN, a strongly fortified city of Armenia, and the capital of the former Russian government of Transcaucasia, 3,000 feet above sea-level, and 170 miles S. W. of Tiflis. The province of the same name has an area of about 10,700 square miles, formerly bordering on

Persia and Asiatic Turkey. The population of the city, before the war, was about 33,000, and that of the province about 970,000, being about equally divided between Mohammedans and Christian Armenians. During the Russian campaigns against Asiatic Turkey, in the World War, Erivan was one of the bases of the Russian forces. In 1920 Erivan became the economic center of the new Armenian Republic, here being established the central wholesale supply depot of the co-operative societies which were exclusively supplying the people with food stuffs.

ERLANGEN, a city of Bavaria, about fifteen miles N. N. W. of Nuremberg, on the Regnitz. Important manufacturing plants are located here, principally turning out woolen and cotton goods, glassware, gloves, and beer. The city was Prussian from 1791 until 1810, when it became Bavarian. It is noted as the location of the Friedrich-Alexander University, which, before the World War, had an average student body of 1,350 The volumes in the local library number a quarter of a million. Pop. about 25,000.

ERLANGEN, UNIVERSITY OF, an institution for higher education, situated in the town of the same name in Bavaria. Founded in 1743 by Frederick, margrave of Bayreuth, its main building was formerly the palace of the margraves in Erlangen. It has four faculties: philosophy, law, medicine, and Protestant theology. Many institutions of learning are connected with the university, among these being extensive clinical and anatomical laboratories. The library contains over 200,000 volumes.

ERMINE, in zoölogy, the ermine weasel, a small mammal. The body in summer is reddish-brown above and white beneath, and in winter is wholly white, except the extremity of the tail, which all the year round is black. It is found in the arctic and temperate parts of Europe, becoming more abundant as one travels N. It occurs also in the corresponding parts of North America, ranging as far S. as the middle of the United States. It frequents stony places and thickets, and is active, fierce and blood-thirsty. It is called also the stoat. It is obtained from Russia in Europe, Norway, Siberia, Lapland, and also, though to a less extent than formerly, in North America. The word is used figuratively to designate the office, position, or dignity of a judge (from his state robe being ornamented or bordered with ermine). In heraldry it designates one of the furs, represented by black spots of a particular shape on a white ground.

ERMLAND, or **ERMELAND**, a diocese of East Prussia, in the district of Königsberg, with the episcopal seat at Braunsberg. It was formerly under the administrative control of Poland, but after the partition of that kingdom, in 1772, was assigned to Prussia.

ERNE, one of the "bare-legged" eagles. The genus includes some seven species, represented apparently in all parts of the world except South America. The common erne or white-tailed sea-eagle is widely distributed in northern Europe and Asia. It occurs in Great Britain, but is rare. Another notable species is the white-headed or bald eagle, the emblem of the United States. This erne is common in North America, both by the coasts and by inland lakes, and also occurs in northern Europe. The general color is brown, but the head and neck of the adults are milky-white, and the same is true of the rounded tail. The size is slightly less than that of the British species. The white-bellied sea-eagle, found round the Australian coasts, and from Ceylon to Cochin-China, and the Asiatic erne, are other important species.

ERNE, LOUGH, a lake in Ireland, county Fermanagh, consisting of a N. or lower, and a S. or upper lake (with the town of Enniskillen between), connected by a narrow, winding channel, and properly forming only expansions of the river Erne. Its entire length is about 40 miles; average breadth 6 miles. It contains numerous islands, and is well stocked with fish.

ERNEST AUGUSTUS, King of Hanover and Duke of Cumberland, the fifth son of George III.; born in 1771. He became a field-marshal in the British army, and on the death of William IV. in 1837, ascended the throne of Hanover, in consequence of the succession to the sovereignty of that country being limited to male heirs. He was succeeded by his son George V., the last of the Hanoverian kings. He died in 1851.

ERNST, OSWALD HERBERT, an American soldier, born near Cincinnati in 1842. He attended Harvard College for two years and graduated from the United States Military Academy in 1864. In the same year he was appointed 1st lieutenant of engineers. He rose through the various grades, in 1898 becoming a brigadier-general. With this rank he served in the volunteers during the Spanish-American War. He was promoted to be major-general in 1916.

His active service included several campaigns in the Civil War, where he served as assistant chief engineer with the Army of Tennessee. He was instructor in practical military engineering at West Point from 1871 to 1878, and from that year until 1886 he was engineer in charge of Western river improvements. For 3 years following he had charge of the harbor improvements on the Texas coast, where he began the great work which resulted in the deepening of the channel at the entrance to Galveston harbor. He served on various boards from 1880 to 1906. From 1893 to 1898 he was superintendent of the United States Military Academy. He was a member of the Isthmian Canal Commission from 1899 to 1901, and again in 1905 and 1906. From 1903 to 1906 he was president of the Mississippi River Commission. He retired from active service in 1906. He wrote "Manual of Practical Military Engineering" and other works on engineering subjects.

EROS, the Greek equivalent of the Latin Cupid, the god of love.

ERSKINE, JOHN, an American educator, born in New York City in 1879. He graduated from Columbia University in 1900 and was in turn instructor of English, assistant professor, and associate professor of English at Amherst, serving until 1909, when he became adjunct professor of English at Columbia University. He was appointed full professor in 1916. He wrote several volumes of poems and was a frequent contributor to magazines on literary subjects. He was coeditor of the Cambridge History of American Literature, 1917-1919. In 1918-1919 he was chairman of the Army Education Commission of the American Expeditionary Forces, and was educational director of the American Expeditionary Forces University at Beaune, France, in 1919.

ERSKINE, THOMAS, a Scotch baron; born in Edinburgh, Jan. 21, 1750; became a noted forensic orator and jurist, attaining most of his renown as a pleader in support of the accusations of corruption made against Lord Sandwich; later he added to his success by his defense of Stockdale, Hardy, Thomas Paine, Horne Tooke, and others. He was a member of the House of Commons in 1790-1806. About the latter date he was created Baron Erskine of Restormel, on becoming lord-chancellor. He died near Edinburgh, Nov. 17, 1823.

ERVINE, ST. JOHN GREER, an Irish dramatist and novelist. He was born at Belfast in 1883 and first came into notice in connection with the Abbey Theater, Dublin, which in 1913 produced his one-act play, "The Magnanimous Lover," written by him in 1907. In 1910 he wrote a four-act play, "Mixed Marriage," produced by the Abbey Theater in 1911. Other of his plays are "John Ferguson," played with great success in New York in 1919, and "Jane Clegg," played in New York in 1920. His novels include: "Mrs. Martin's Man," "Alice and a Family," "Changing Winds," and "The Foolish Lovers." He was trooper in the Household Battalion in the World War; after serving as 2d lieutenant, Dublin Fusiliers, was wounded, May, 1918, and invalided home. He wrote a political study, "Sir Edward Carson and the Ulster Movement," and he lectured in the United States in 1920.

ERYSIPELAS, a peculiar inflammation of the skin, spreading with great rapidity; the parts affected are of a deep red color, with a diffused swelling of the underlying cutaneous tissue and cellular membrane, and an indisposition to take on healthy action. Erysipelas is divided into: (1) Simple, where the skin only is affected; (2) Phlegmonous, where the cutaneous and areolar tissues are both attacked at the same time, going on to vesication, then yellowness, and death of the skin; death of the areolar tissue may follow, constituting malignant or gangrenous erysipelas; (3) Œdematous, or sub-cutaneous, of a yellowish, dark brown, or red color, occurring about the eyelids, scrotum, or legs, usually in broken-down dropsical constitutions. The first is superficial and sthenic, the other forms more deep-seated and asthenic.

Some physicians speak highly of poultices of phytolacca leaves, while others recommend topical applications of some form of iron in tincture. The constitutional treatment is mainly restorative.

ERYX, an ancient city and a mountain in the W. of Sicily, about 2 miles from the sea-coast. The mountain, now Monte San Giuliano, rises direct from the plain to a height of 2,184 feet. On the summit anciently stood a celebrated temple of Venus. All traces of the ancient town of Eryx have now disappeared, and its site is occupied by the modern town of San Giuliano.

ERZERUM (erz-röm′), an important town in the Armenian Republic, in lat. 39° 55′ N. and lon. 41° 20′ E., not far from the Kara-Su, or W. source of the Euphrates. It is situated on a high but tolerably well cultivated plain, 6,200 feet above the level of the sea, surrounded by mountains. The climate is cold in winter, but hot and dry in summer. In November, 1901, an earthquake

destroyed over 1,000 houses, with a small loss of life. During the World War important operations were carried on around the city. The Russians captured it in February, 1916, following its evacuation by the Turkish garrison. Pop. variously estimated from 50,000 to 100,000.

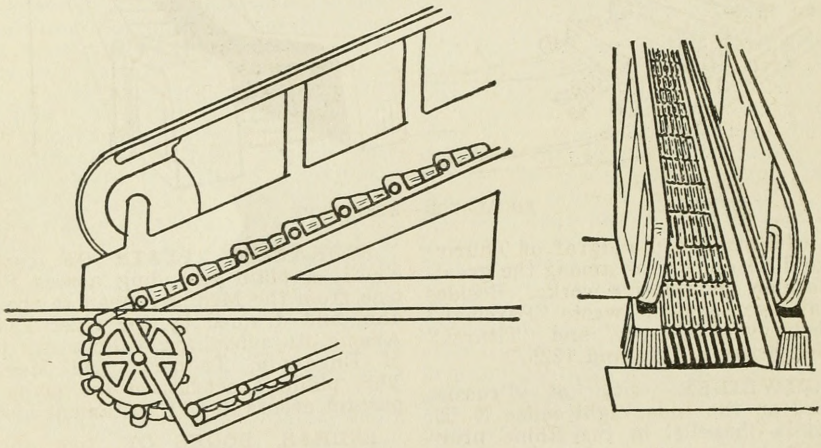
ERZGEBIRGE (erts'ge-bēr-ge), or **ORE MOUNTAINS**, a chain of European mountains forming a natural boundary between Saxony and Bohemia, nearly 120 miles in length and 25 miles broad. The highest summits, which are on the side of Saxony, rise to 3,800 or 3,900 feet. The mountains are rich in silver, iron, copper, lead, cobalt, arsenic, etc.

ERZINGAN, a city of Armenia, formerly capital of a sandjak, in the vilayet of Erzerum, Asiatic Turkey, 86 miles S. E. of Erzerum, a strongly fortified town, situated at an altitude of 3,900 feet, and about a mile from the right bank of the Euphrates, the center of a very fertile plain, where wheat, fruit, wines, and cotton are produced in large quantities. Iron and sulphur springs are also abundant in the vicinity. It was the object of a special campaign by the Russian Caucasian Army, which resulted in its capture by the Russians on July 25, 1916. Since the war it has become part of the territory of the new Armenian state. Pop. about 18,000, half being Mohammedans and half Christian Armenians.

ESAU, the eldest son of Isaac, and twin brother of Jacob. His name (which signifies rough, hairy) was due to his singular appearance at birth, being "red, and all over like an hairy garment." His story is told in the book of Genesis. He was the progenitor of the Edmonites, who dwelt on Mount Seir.

ESCALATOR, an elevator in the form of a moving stairway. It is the most efficient machine for handling people in large numbers when the distance to be traveled is not excessive. The passengers travel on the moving treads and a single large-size escalator will deliver more than 10,000 persons per hour. Its use is principally for department stores, railroad and subway stations, theaters, and for large manufacturing plants where great numbers of employees must be transported quickly between the entrance to the building and the upper floors. They are made reversible for operation in opposite directions during different periods of the day.

ESCANABA, a city and county-seat of Delta co., Mich., on the N. end of Green Bay, at the mouth of the Escanaba river, and on the Chicago and Northwestern railroad; 52 miles N. E. of Marinette. It is the grain and vegetable raising and lumbering center of the county and an important iron-shipping point. It has passenger and freight steamer connections with all the leading ports on the Great Lakes, public high school, St. Joseph's high school, public library, daily and weekly newspapers, and a National bank. Pop. (1910) 13,194; (1920) 13,103.



ESCALATOR—CLEAT TYPE

ESCAPEMENT, a device intervening between the power and the time-measurer in a clock or watch, to convert a continuous rotary into an oscillating isochronous movement. It is acted on by each. Clocks and watches are generally named according to the form of their escapement; as, chronometer,

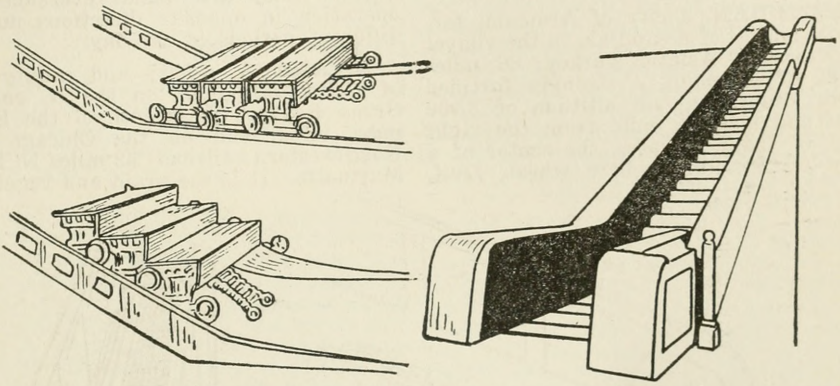
crown wheel, cylinder, deadbeat, detached, duplex, horizontal, and lever escapement, etc.

ESCHATOLOGY (es-ka-), in theology, the "doctrine respecting the last things," which treats of the millennium, the second advent of Christ, the resurrection, judgment, conflagration of the world, and the final state of the dead.

ESCHENBACH, WOLFRAM VON (esh'en-bäch), a German mediæval poet; born of a noble family in Eschenbach, near Ansbach, Bavaria, in the second half of the 12th century. He was one of the most prominent minstrels at the court of Hermann, Landgraf of Thuringia; and his epics rank among the greatest German imaginative works. Besides several love songs he wrote "Parcival," "Wilhelm von Orange," and "Titurel." He died between 1218 and 1225.

ESCHWEILER, city of Prussia, situated on the Inde, eight miles N. E. of Aix-la-Chapelle, in the Rhine province. It is the center of a rich wine-producing region. Following the armistice which concluded the World War, it became part of the territory occupied by the Allied forces as a guarantee of the fulfillment of the provisions of the Treaty of Peace.

ESCURIAL (es-kū'ri-al), a famous monastery of New Castle, Spain, in the province of Madrid. This solitary pile of granite has been called the eighth wonder of the world, and at the time of its erection surpassed every other building of the kind in size and magnificence. It owes its origin, it is said, to an inspired vow made by Philip II. during the battle of St. Quentin, who promised St. Lorenzo that, should victory be granted to him, he would dedicate a monastery to the saint. The escurial was begun in 1563 and finished in 1584, and was intended to serve as a palace, mausoleum, and monastery. It has a splendid chapel with three naves 320 feet long and 320 in height to the top of the cupola. The pantheon, or royal tomb, is a magnificently decorated octagon chamber 36 feet in diameter by 38 feet in height, in the eight sides of which are numerous black marble sarcophagi. Its library, previous to the sack by the French in 1808, contained 30,000 printed and 4,300 MS. volumes, mainly treasures of Arabic literature. In 1872 the escurial was struck by lightning and partially burned.



ESCALATOR—STEP TYPE

ESDRAELON, PLAIN OF (ez-drae'lon), a plain extending across Palestine from the Mediterranean to the Jordan, and drained by the river Kishon. Among its subsidiary valleys are those of Engannin, Taanach, and Megiddo. This plain is celebrated for many important events in Old Testament history.

ESDRAS, BOOKS OF, two apocryphal books, which in the Vulgate and other editions are incorporated with the canonical books of Scripture. In the Vulgate the canonical books of Ezra and Nehemiah are called the first and second, and the apocryphal books the third and fourth books of Esdras. The Geneva Bible (1560) first adopted the present nomenclature, calling the two apocryphal books first and second Esdras. The subject of the first book of Esdras is the same as that of Ezra and Nehemiah, and in general it appears to be copied from the canonical Scriptures. The second book of Esdras is supposed to have been either of much later date, or to have been interpolated by Christian writers.

ESK (Celtic for water), the name of two small rivers in England, one in Cumberland and one in Yorkshire; and

of several in Scotland, the chief being the Esk in Dumfriesshire; the North Esk and South Esk in Forfarshire; and the North Esk and South Esk in Edinburghshire.

ESKILSTUNA, a city of Sweden, situated on the Eskilstuna river, about 60 miles W. of Stockholm. It is noted for its large steel manufacturing plants, in which are produced fine cutlery and small arms. A large gun factory is located on an island in the river. Pop. about 30,000.

ESKIMO, the name of the inhabitants of the N. coast of the American continent down to lat. 60° N. on the W., and 55° on the E., and of the Arctic Islands, Greenland, and about 400 miles of the nearest Asiatic coast. They prefer the vicinity of the seashore. Their number scarcely amounts to 40,000. Nevertheless they are scattered as the sole native occupants of regions stretching from E. to W. as far as 3,200 miles in a straight line.

Race.—They used to be classed among nations of the Mongolian stock; but now they are considered as akin to the American Indians. Their height nearly equals the average of the N. W. Indians. They appear comparatively taller sitting than standing. Their hands and feet are small, their faces oval, but rather broad in the lower part; their skin is only slightly brown; they have coarse black hair and very little beard. The skull is high.

Habits.—The Eskimos get their subsistence mostly from hunting by sea, using for this purpose skin boats where the sea is open, and dog sledges on the ice. From the skin, blubber, and flesh of the seal and the cetaceous animals, they procure clothes, fuel, light, and food. Their most interesting as well as important invention for hunting is the well-known small skin boat for one man, called a kayak. It is formed of a framework covered with skin, and, together with his waterproof jacket, it completely protects the man against the waves, so that he is able to rise unhurt by means of his paddle, even should he capsize. A Greenlander's kayak is almost 18 feet long and 2 feet broad, and can carry 200 pounds besides the man. The special weapon of the kayak is the large harpoon, connected by a line with an inflated bladder. The hunter throws it when but 25 feet from the seal, and at once drops the bladder overboard, thus retarding the speed of the wounded animal, which runs off with it till finally killed by a lance-thrust. Their winter dwellings vary with regard to the materials of which they are built, as well as in their form. In the farthest W. they are constructed mostly of planks, covered only with a layer of turf or sod; in Greenland the walls consist of stones and sod; in the central regions the houses are formed merely out of snow. In Alaska the interior is a square room, surrounded by the sleeping places, with the entrance on one side, while a hearth with wood as fuel occupies the middle of the floor. In Greenland the room is heated only by lamps, and the sleeping places or family stalls are arranged in a row occupying one of its sides. The number of inhabitants at an Eskimo station is generally under 40.

Dress.—The dress of the Eskimos is almost the same for the women as for the men, consisting of trousers or breeches and a tunic or coat fitting close to the body, made of skins, and covering also the head by a prolongation that forms the hood. For women with children to carry, this hood is widened so as to make it an excellent cradle, the amaut.

Language.—The language is characterized by the power of expressing in one word a whole sentence in which are embodied a number of ideas which in other languages require separate words. The Greenland dictionary contains 1,370 radicals and about 200 affixes. A radical may be made the foundation of thousands of derivatives, and a word can be composed which expresses with perfect distinctness what in our civilized languages might require 20 words. In Greenland and Labrador the missionaries have adapted the Roman letters for reducing the native language to writing.

Sociology.—It is doubtful whether an organization like that of the Indian "families" has been discovered among the Eskimos. But a division into tribes, each with their separate territories, actually exists. The tribe again is divided into groups constituting the inhabitants of the different wintering places. Finally, in the same station, the inhabitants of the same house are closely united with regard to common housekeeping. In this, and perhaps similar ways, their general communism in living, characteristic of their stage of culture, is governed by rules for partnership in householding, for distribution of the daily game during the winter, and for the possessions of the individual, the family, the housemates, and the placefellows. One of the oldest and most respectable men, called in Greenland itok, in Labrador angajorkak, is obeyed as chief of a house or wintering place, though his authority, perhaps, may rest on tacit agreement only.

Religion.—The inhabitants of Danish West Greenland, numbering about 10,000, the greater part of the Labradorians, and the southern Alaska Eskimos are Christianized. As for the rest, the religion of the Eskimos is what is generally designated as Shamanism.

The name Eskimo is said to be formed by corruption out of an Indian word signifying "eaters of raw meat." They call themselves Inuit, in Greenland partly Kaladlit. Their origin generally has been derived from Asia, but now they are believed by some to have come from the interior of America. The Eskimos may be divided into the following groups: (1) The Western Eskimos, inhabiting the Alaska territory and the Asiatic side of Bering Strait; (2) the Mackenzie Eskimos, or Tchiglits, from Barter Island to Cape Bathurst; (3) the inhabitants of the central regions, including the Arctic Archipelago; (4) the Labradorians; (5) the Greenlanders. A side branch inhabits the Aleutian Islands.

ESMOND, HENRY V., an English actor and playwright, whose real name was Jack, born at Hampton Court, England, in 1869. He was educated privately and went on the stage in 1885. Since 1896, however, he turned to the writing of plays, many of which were successful. They include "One Summer's Day" (1897); "The Wilderness" (1901); "When We Were Twenty-One" (1901); "Under the Greenwood Tree" (1907); "The Dangerous Age" (1914); and others. Many of his plays were produced with great success in the United States.

ESPARTO, a plant growing in Spain, Algeria, Tripoli, Tunis, and northern Africa, long applied to the manufacture of cordage, matting, etc., and now extensively used for papermaking. This plant is a species of grass 2 to 4 feet high, covering large tracts in its native regions, and also cultivated, especially in Spain.

ESPIRITO SANTO, a state of Brazil, bordered by the Atlantic Ocean on the E. It has an area of 17,310 square miles. The coast region is for the most part swampy, but there are cliffs in the S. The interior is mountainous, with an elevation reaching 7,000 feet. The chief river is the Rio Doce, which divides the state into two parts. The soil is well adapted for cultivation. The chief products are sugar cane and coffee. There are also considerable quantities of cotton and rice. The principal export is coffee. Rare woods and drugs are obtained from the forests. Fishing is an important occupation of the people. There is no mining, but there are valuable deposits of marble and lime. The state has about 50 miles of railway. Pop. (1917) 482,308. The capital is Victoria.

ESQUIMALT (eski-mo), a seaport and harbor of British Columbia, on the S. E. coast of Vancouver Island, and on the Strait of San Juan de Fuca; 4 miles from Victoria. The harbor is extensive and capable of receiving vessels of the greatest size, and is the British naval station for this part of the Pacific coast. It has a navy yard, marine hospital, a large dry dock built by the Dominion Government in 1888, and a meteorological station. In 1894 the British Government constructed elaborate defenses at Esquimalt. In 1908 the Canadian Government took over the military charge of forts, etc. The harbors of both Esquimalt and Victoria are kept thoroughly mined and wired, and constitute one of the best defended naval stations in the world. Pop. about 3,000.

ESQUIRE, originally, a shield-bearer or armor-bearer, an attendant on a knight; hence, in modern times a title of dignity next in degree below a knight. In England this title is given properly to the younger sons of noblemen, to officers of the king's courts and of the household, to counsellors at law, justices of the peace while in commission, sheriffs, gentlemen who have held commissions in the army and navy, etc. Both there and in the United States in the addresses of letters esquire may be put as a complimentary adjunct to almost any person's name. In heraldry the helmet of an esquire is represented sideways with the visor closed.

ESSAD TOPTANI, PASHA, an Albanian soldier and military leader, born near Durazzo, about 1863. He served in the Turkish army and rose to the command of the gendarmerie of Constantinople. He fought in the war against Greece in 1897, and for his services was given the title Pasha. He killed the agent who had been ordered by the Sultan Abdul Hamid to murder his brother, Ghani Toptani, but his influence was so great that Abdul Hamid feared to punish him. Essad was instead transferred to Janina, where he rose to the rank of general. He joined the Young Turk movement in 1908 and was among the leaders who opposed Abdul Hamid. During the Balkan War he defended Scutari against the Montenegrins, and when the Great Powers declared for the self-government of Albania, he declared for the independence of that country. In

1913 he was a member of the provisional Albanian Government, and in 1914 was appointed Minister of War and of the Interior. He was assassinated in Paris in 1920.

ESSEN, a town of Rhenish Prussia, 18 miles N. E. of Düsseldorf, founded in the 9th century, and adorned with a fine church dating from 873. It increased with great rapidity, and is celebrated for the steel and iron works of the Krupps, the most extensive in Europe. This great establishment was started in 1827, with only two workmen. During the World War Essen was one of the most important of the German cities. At the Krupp works were produced vast quantities of armament and munitions. Attempts, some very successful, were made by Allied aviators to damage and destroy the works. Following peace, the works were devoted to the manufacture of various steel products. In the suburbs are the "colonies"—cottages, churches, schools, stores, libraries, places of amusement, homes for the superannuated and disabled workmen, etc., established by the Krupps for their workmen. Pop. about 400,000.

ESSENCE, in philosophy, originally the same as substance. Later, substance came to be used for the undetermined substratum of a thing, essence for the qualities expressed in the definition of a thing; or, as Locke put it, "Essence may be taken for the very being of a thing, whereby it is what it is." In chemistry, and in popular parlance, essences are solutions of the essential oils in alcohol. The term has, however, received a wider significance, and is applied to any liquid possessing the properties of the substance of which it professes to be the essence. Thus essences of coffee, beef, and rennet contain in a concentrated form the virtues of coffee, beef, and rennet.

ESSENES (ĕs-sēnz'), or **ESSÆANS**, a sect among the Jews, the origin of which is unknown, as well as the etymology of their name. It appears to have sprung up in the course of the century preceding the Christian era, and disappeared on the dispersion of the Jews after the siege of Jerusalem. They were remarkable for their strictness and abstinence, and had a rule of life analogous to that of a monastic order.

ESSENTIAL OILS, volatile oils usually drawn from aromatic plants by subjecting them to distillation with waters, such as the oils of lavender, cloves, peppermint, etc.

ESSEQUIBO (es-se-kē'bō), a river of British Guiana, which flows into the Atlantic by an estuary 20 miles in width after a course of about 450 miles. The district or division of Essequibo is well cultivated and extremely fertile, producing coffee, cotton, cocoa, and sugar. Pop. 36,000.

ESSEX, a maritime county of England, with an area of 1,530.5 square miles, and a coast line of 85 miles. The surface of the coast is low and marshy, but from the center to the north is undulating and well wooded. There is a considerable amount of good agricultural land, and wheat and barley are largely grown. Stock raising is also important. Its manufactures include chemicals, railroad machinery, agricultural implements, brewing, fishing, and oyster fishing. Pop. about 1,400,000.

ESSEX, ROBERT DEVEREUX, EARL OF, an English soldier; born in 1591. When 11 years old he was restored by James I. to the rank and titles held by his father, the 2d earl, and became a companion of the young Prince of Wales, and when 15 years of age was married to Frances Howard, daughter of the Earl of Suffolk, from whom he was divorced in 1613. He served in the army of the elector palatine in Holland 1620-1623, was vice-admiral of an unsuccessful naval expedition against Cadiz in 1625, and was lieutenant-general of an army sent by King Charles against the Scotch Covenanters in 1639. Espousing the cause of the Parliament against the king, he was appointed to the command of the parliamentary army at the beginning of the civil war, was victorious over Charles at Edgehill in 1642, captured Reading in 1643, and relieved Gloucester, but lost the greater part of his army in 1644. He urged the impeachment of Cromwell before the House of Lords in 1645, and had to resign his commission. An annuity of £10,000 was settled on him for life. He died in 1646.

ESSLING, a village in Lower Austria on the Danube, 6 miles below Vienna, near which a battle was fought May 21-22, 1809, between the French and Austrians, in which the former were victorious. Marshal Lannes was killed in this battle, Marshal Masséna receiving the title of the Prince of Essling.

ESSLINGEN, a city of Württemberg, situated on the Neckar, seven miles E. S. E. of Stuttgart. The largest machine shops of Württemberg are located here, employing, before the World War, about 2,200 men. It also manufactures gold and silver ware, cotton goods, and is the center of a region producing the famous Neckar wine. Pop. about 32,000.

ESTABLISHED CHURCH, a Church having a form of doctrine and government established by law in any country for the teaching of Christianity within its boundaries, and usually endowed by the state. The upholders of the establishment theory maintain that it is the duty of a state to provide for the religious instruction of the people. On the other hand it is argued that the state has no right to endow or support any particular sect or denomination, unless they assume that the denomination alone is possessed of religious truth and worth.

ESTAING (es-tan'), **CHARLES HECTOR, COMTE D'**, a French army and navy officer; born in 1729. He entered the French army as colonel of infantry; was promoted Brigadier-General in 1757; accompanied the expedition of Comte de Lally to the East Indies, and was captured at the siege of Madras, 1759. He was released on parole, and without awaiting exchange took command of several men-of-war, and greatly harassed the English in various parts of the East. On his return to France in 1760, he accidentally fell into the hands of the English, and was imprisoned in Portsmouth. In 1763 he was appointed Lieutenant-General, and in 1777 vice-admiral in the French navy. In 1778, in accordance with the treaty between France and the United States, France fitted out a fleet of 12 ships of the line and 4 frigates to aid the latter in the struggle against Great Britain, and Estaing was placed in command. He sailed April 13, reached Delaware Bay in July, and then proceeded to New York, expecting to encounter the British fleet on the way. He captured some prizes off the coast of New Jersey, agreed to assist in a land and sea attack on Newport to expel the British from Rhode Island, but was unable to carry out his plans. Subsequently he captured St. Vincent and Grenada, West Indies, and in 1779 co-operated with General Lincoln in an ineffectual attempt to capture Savannah, Ga. He returned to France in 1780; commanded the allied fleets of France and Spain in 1783; was elected to the assembly of nobles in 1787; appointed to the command of the national guard in 1789; chosen admiral of the navy in 1792; testified in favor of Marie Antoinette at her trial in 1793; and was condemned as a royalist and guillotined in 1794.

ESTATE, a term ordinarily applied to designate landed property. The application has its origin in the feudal system, under which land was not conceived as being capable of absolute ownership but as the property of the Crown, of which subjects were the tenants. The interest of a particular tenant in a piece of land was thus known as his status or estate in reference to it, and this interest was considered to be limited, partly by the nature of land itself, and partly by the reversionary interest of the Crown. The term had not at first the wide application which modern usage has given to it. It was in the beginning employed as applicable only to lands held on a freehold basis, and did not, as later, include land held in subordination to other superior titles. The term has gradually come to have a general application to landed property held under varying conditions, such as that subject to creditors' rights, the interest of mortgages and leaseholds. Estates of freehold under our legal system include estates held under the three forms of freehold tenure, known as fee simple, fee tail and life estates. Estates not of freehold are in their nature really tenancies.

ESTE (es'tā), a town in the province of Padua, Italy, 17 miles S. W. of Padua; the ancient Adeste. Pop. about 6,000. Also one of the most ancient and illustrious families of Italy. In the 11th century the house of Este became connected by marriage with the German Welfs or Guelphs, and founded the German branch of the house of Este, the dukes of Brunswick and Hanover. The sovereigns of Ferrara and Modena were of this family, several of them being famous as patrons of letters. The lives of Boiardo, Ariosto, and Tasso were closely connected with members of this house. The last male representative of the Estes died in 1803. His daughter married a son of Emperor Francis I., who founded the Austrian branch of the house of Este, of which the male line became extinct in 1875.

ESTERHAZY (es'ter-hä-ze), a family of Hungarian magnates, whose authentic genealogy goes back to the first half of the 13th century. They were zealous partisans of the house of Hapsburg, to whom, during the reigns of Frederick II. and Leopold I., they lent a powerful support. Among the more prominent members of the family are: PAUL IV., PRINCE ESTERHAZY, a general and literary savant, 1635-1713. His grandson, NICHOLAS JOSEPH, a great patron of arts and music, founder of the school in which Haydn and Pleyel, among others, were formed, 1714-1790. NICHOLAS, PRINCE ESTERHAZY, distinguished as a field marshal and foreign ambassador, 1765-1833. PRINCE PAUL ANTHONY, a distinguished and able diplomatist; born 1786; was successively Austrian ambassador at Dresden, Rome, and Britain; a supporter of the National Hungarian movement. He died in 1866.

ESTERS, ethereal salts formed by the reaction between an acid and an alcohol. For instance

$C_2H_5OH + HCl$
Alcohol Hydrochloric Acid
$C_2H_5Cl + H_2O$
Ethyl Chloride Water

Ethyl Chloride is the hydrochloric acid ester of ethyl alcohol. The change from an alcohol to an ester is never complete, because the reaction is reversible; that is to say, esters are decomposed by water, giving acid and alcohol. When an alcohol and an acid are mixed, therefore, the reaction illustrated above proceeds to a certain point until a balance, or equilibrium, is reached, the final product being a mixture of alcohol, acid, ester, and water. If, however, the water produced is removed, and so prevented from decomposing the ester, the reaction is far more nearly complete, and it is a common practice to employ, a dehydrating agent, such as sulphuric acid, which combines with the water as fast as it is formed.

Esters are usually pleasant-smelling, colorless liquids, and the odor of flowers and fruits is frequently due to their presence. Many artificial flavorings, essences, and perfumes consist of esters. Some of the best known are methyl salicylate (oil of wintergreen) amyl acetate (banana or pear oil) methyl butyrate (pineapple oil) and isoamyl isovalerate (apple oil).

ESTHER (es'ter), a Jewess who became the queen of Ahasuerus, King of Persia, and whose story is told in the book of the Old Testament called by her name. This book is supposed by some to be the composition of Mordecai himself, the uncle of the heroine. The feast of Purim, which commemorates the events narrated, is still observed by the Jews during the month Adar.

ESTHONIA, a former maritime government of Russia, bounded by the Gulf of Finland, the Baltic and the former governments of Livonia and Petrograd. It includes several islands, of which the most important are Dagoe and Oesel; area, 23,160 square miles. It has for the most part a flat or undulating surface. The whole of the N. side, however, rises considerably above the sea, and presents to it ranges of cliffs. The Narva, which merely bounds Esthonia on the E., is the only river of any importance; but minor streams, as well as small lakes, are very numerous. About a fourth of the surface is covered with forests of pine, birch, and alder. The crops include a little wheat, much barley and oats, and some flax, hops, and tobacco. Cattle are reared, and active fisheries are carried on. The peasantry are almost all of Finnish origin, and speak a Finnish dialect. In the 10th and 12th centuries it belonged to Denmark; it was afterward annexed by Sweden, and in 1710 was seized by Russia. Reval is the capital. Pop. (1919) 1,744,000. On Feb. 24, 1918, the National Council of Esthonia declared for an independent state, which was recognized de facto by Great Britain. After the conclusion of the World War (1914-1918) the government of Esthonia was established.

ESTRADA, a town of Spain, in the province of Pontevedra. It is on the Rio Ulla. It is the center of an extensive farming and stock-raising region, and has manufactures of woolen and linen goods. Pop. about 30,000.

ESTRADA CABRERA, MANUEL, a president of Guatemala, born in Guatemala in 1857. He studied law and became a justice of the Supreme Court. In 1892 he was appointed Secretary of State. He became acting president in 1898, following the assassination of President Barrios, and was successively reelected, becoming actual dictator of the country. He did much in improving conditions in Guatemala, especially along agricultural and industrial lines. He was compelled to abdicate the presidency in 1920.

ESTREMADURA (es-trā-mä-dö'rä), a W. division of Spain, consisting of the provinces of Badajoz and Caceres. It is fertile, but not cultivated to its full extent. The Tagus and Guadiana intersect it E. to W. Immense flocks of sheep graze on the rich plains. The area is about 16,100 square miles. Pop. 882,000.

ESTREMADURA, a maritime province of Portugal, divided by the Tagus into two nearly equal parts, of which the N. is the more mountainous. Wines and olives are the principal produce. The principal city is Lisbon. Area, 6,937 square miles. Pop. about 1,250,000.

ESTUARY, the wide mouth of a river opening out so as to form an arm of the sea.

ETAWAH (e-tä'wä), a town in Hindustan, Northwest provinces; capital of the district of the same name on the left bank of the Jumna, picturesquely situated among ravines, and richly planted with trees. It has some good buildings and a considerable trade.

ETCHING, the art of producing designs on a plate of steel or copper by means of lines drawn with an etching needle. See ENGRAVING.

ETEOCLES (e-tē'ō-klēz), and **POLYNICES** (pol-ī-nī'sēz), two heroes of ancient Greek legend, sons of Œdipus, King of Thebes. After their father's banishment from Thebes, Eteocles usurped the throne to the exclusion of his brother, an act which led to an expedition of Polynices and others against Thebes. The two brothers fell by each other's hand. See ANTIGONE.

ETHELBERT, King of Kent; born about 560. He succeeded his father, Hermenric, and reduced all the Anglo-Saxon states, except Northumberland, to the condition of his dependents. Ethelbert married Bertha, the daughter of Caribert, King of Paris, and a Christian princess, an event which led indirectly to the introduction of Christianity into England by St. Augustine. Ethelbert was the first Anglo-Saxon king to draw up a code of laws. He died 616.

ETHELBERT, King of England, son of Ethelwulf, succeeded to the government of the E. side of the kingdom in 857, and in 860, on the death of his brother, Ethelbald, became sole king. His reign was much disturbed by the inroads of the Danes. He died in 866.

ETHELRED I., King of England, son of Ethelwulf, succeeded his brother Ethelbert in 866. The Danes became so formidable in his reign as to threaten the conquest of the whole kingdom. Ethelred died in consequence of a wound received in an action with the Danes in 871, and was succeeded by his brother Alfred.

ETHELRED II., King of England, son of Edgar; born 968; succeeded his brother, Edward the Martyr, in 978, and, for his want of vigor and capacity, was surnamed the Unready. In his reign began the practice of buying off the Danes by presents of money. After repeated payments of tribute he effected, in 1002, a massacre of the Danes; but this led to Sweyn gathering a large force together and carrying fire and sword through the country. They were again bribed to depart; but, upon a new invasion, Sweyn obliged the nobles to swear allegiance to him as King of England; while Ethelred, in 1013, fled to Normandy. On the death of Sweyn he was invited to resume the government, and died in London in the midst of his struggle with Canute (1016).

ETHELWULFE, King of England, succeeded his father, Egbert, about 837. His reign was in great measure occupied in repelling Danish incursions; but he is best remembered for his donation to the clergy, which is often quoted as the origin of the system of tithes. He died 857.

ETHENDUN, BATTLE OF, the victory which Alfred the Great gained over the Danes (878), and which led to the treaty with Guthrum, the Danish King of East England. The locality is doubtful.

ETHER, or **ÆTHER**, a medium filling all space. The ether seems to be of the nature of an elastic solid, and, in order to account for the immense rapidity of its vibrations when radiation passes through it, its rigidity must be excessively large compared with its density. It may be asked, how, if this be so, the earth can move through the ether at the rate of nearly a million miles per day. But, if we consider that shoemaker's wax is so brittle a solid that it splinters under the blow of a hammer and that it yet flows slowly like a liquid into the crevices of a vessel in which it is placed, and that bullets sink slowly down through it, and corks float slowly up through it, the motion of the earth through the ether does not seem so incomprehensible. From magneto-optic phenomena it seems certain that something of the nature of molecular rotation is going on in the ether.

ETHERS, compounds containing two alkyl groups, which may be identical or different, united to an oxygen atom. For instance, methyl ether has the formula $CH_3.O.CH_3$, and consists of the two identical methyl groups, CH_3, united to the oxygen atom. Methyl ethyl ether has the formula $CH_3.O.C_2H_5$, the alkyl groups in this case being different. Methyl ether is a gas, but all other ethers are mobile, volatile, inflammable liquids. The best known is ethyl ether, $C_2H_5.O.C_2H_5$, sometimes known as sulphuric ether, and this is the ether used in surgery as an anæsthetic. It is prepared from alcohol, by heating with sulphuric acid, ethyl hydrogen sulphate being first produced, this compound reacting with more alcohol to yield ether and sulphuric acid. Sulphuric ether is a colorless liquid, boiling at 35° C, and having a specific gravity of 0.720. It is highly inflammable, and its vapor forms an explosive mixture with air. Its odor to some is pleasant, but to those on whom it has been used as an anæsthetic it is apt, afterward, to produce nausea. Large quantities of it are used in the manufacture of smokeless powder and as a solvent for fats, resins, alkaloids, etc.

ETHICAL CULTURE SOCIETY, an organization founded in New York in 1876 by Dr. Felix Adler for the purpose of associating together those who be-

cause of antagonism to traditional creeds and ceremonies had drifted away from organized churches and synagogues. His purpose was to promote the moral development of society and the individual by emphasis upon the humanitarian impulses of men and women and by holding up a high moral standard of conduct. Meetings of the society were held on Sundays and an address on some social or economic question was made. The moral aspect of the problem was stressed. The importance which the society placed on education led them to establish the New York Ethical Culture School. This school, providing elementary and secondary instruction, was among the first to assign to manual training an important role in the elementary education. In 1882 a similar society for ethical culture was formed in Chicago, and three years later an organization was effected in Philadelphia. By 1915 they numbered in membership 2,500, being confined mostly to the large cities. Societies have also been formed in England and Germany.

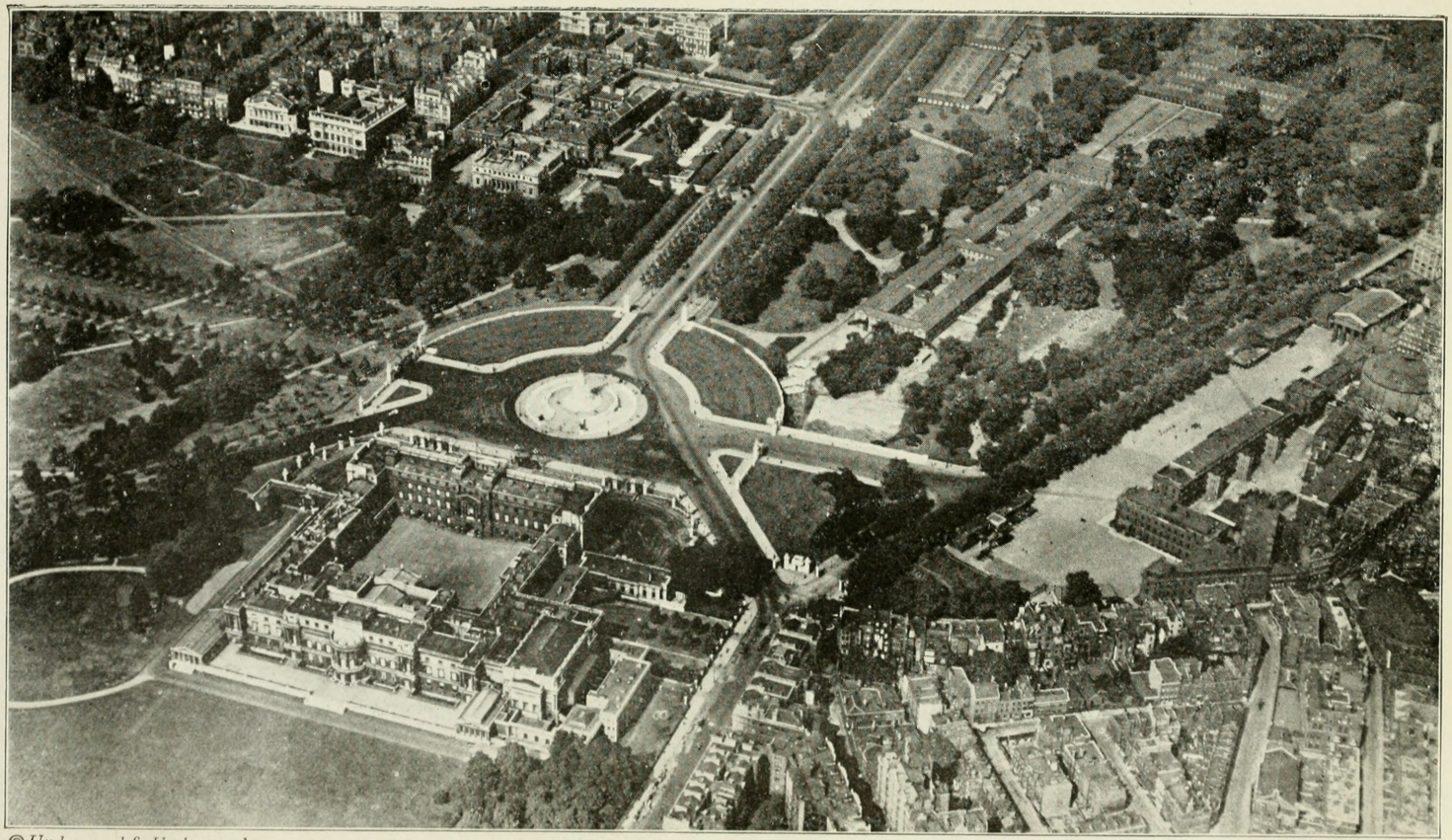
ETHICS, that branch of moral philosophy which is concerned with human character and conduct. It deals with man as a source of action and is closely related to psychology and sociology. It seeks to determine the principles by which conduct is to be regulated, having to do not merely with what is, but with what ought to be. Modern ethics has frequently a distinctly legal or theological stamp, being presented as a system of duties prescribed by God, or by conscience. Underlying this notion is the conception of certain kinds of conduct, or certain types of character, as better than others or preferable to them. The doctrine that pleasure is the highest good was held by predecessors and contemporaries of Aristotle, and was afterward formulated by EPICURUS (*q. v.*) into an ethical theory. Contrasted with this is Universalistic Hedonism or Utilitarianism, which owes its development to modern, and especially to English writers, and holds that the chief good is the happiness or pleasure of the community, or of mankind, or even of sentient creatures. The founder of modern utilitarianism was DAVID HUME (*q. v.*). The utilitarianism of PALEY (*q. v.*) was founded on the belief that the happiness of mankind was the ethical end prescribed by God; that of BENTHAM (*q. v.*) resulted from looking at action from the point of view of the community and its interests rather than from that of the interests of the individual. Applied only to the method of utilitarianism in HERBERT SPENCER'S (*q. v.*) hands, the evolution theory has been used by other writers to show the inadequacy of the utilitarian principle.

The controversies, especially of English ethics, have been largely occupied with the debate on the question between the empirical and intuitive schools of ethics. The intuitive school lays stress on the immediateness and universality of the moral judgment passed by each man's conscience. A doctrine of the Moral Sense, as a feeling or perception by which action or motives are morally distinguished apart from their consequences, was developed by SHAFTESBURY (*q. v.*) and HUTCHESON (*q. v.*); and W. A. Butler formulated the doctrine that conscience is the supreme authority as to what is right or wrong.

The introduction of Christianity brought a new element into ethical speculation; among Christians ethics was intimately associated with theology, and morality was regarded as based on and regulated by a definite code contained in the sacred writings. Most modern ethical systems consider the subject as apart from theology and as based on independent philosophical principles; they fall into one of two great classes, the utilitarian and the rationalistic systems. The first of the modern school in England was Hobbes (1588-1679). Among subsequent names are those of Cudworth, Locke, Clarke, Shaftesbury, Butler, Hutcheson, Hume, Adam Smith, Reid, Paley, Whewell, Bentham, and John Stuart Mill.

ETHIOPIA, or **ÆTHIOPIA**, in ancient geography is the country lying to the south of Egypt, and comprehending the modern Nubia, Kordofan, Abyssinia, and other adjacent districts; but its limits were not clearly defined. It was vaguely spoken of in Greek and Roman accounts as the land of the Ichthyophagi or fish-eaters, the Macrobii or long-livers, the Troglodytes or dwellers in caves, and of the Pygmies or dwarf races. In ancient times its history was closely connected with that of Egypt, and about the 8th century B. C. it imposed a dynasty on Lower Egypt, and acquired a predominant influence in the valley of the Nile. In sacred history Ethiopia is repeatedly mentioned as a powerful military kingdom (see particularly Isaiah xx: 5). In the 6th century B. C. the Persian Cambyses invaded Ethiopia; but the country maintained its independence till it became tributary to the Romans in the reign of Augustus. Subsequently Ethiopia came to be the designation of the country now known as Abyssinia, and the Abyssinian monarchs still call themselves rulers of Ethiopia.

Language.—The Ethiopian language,



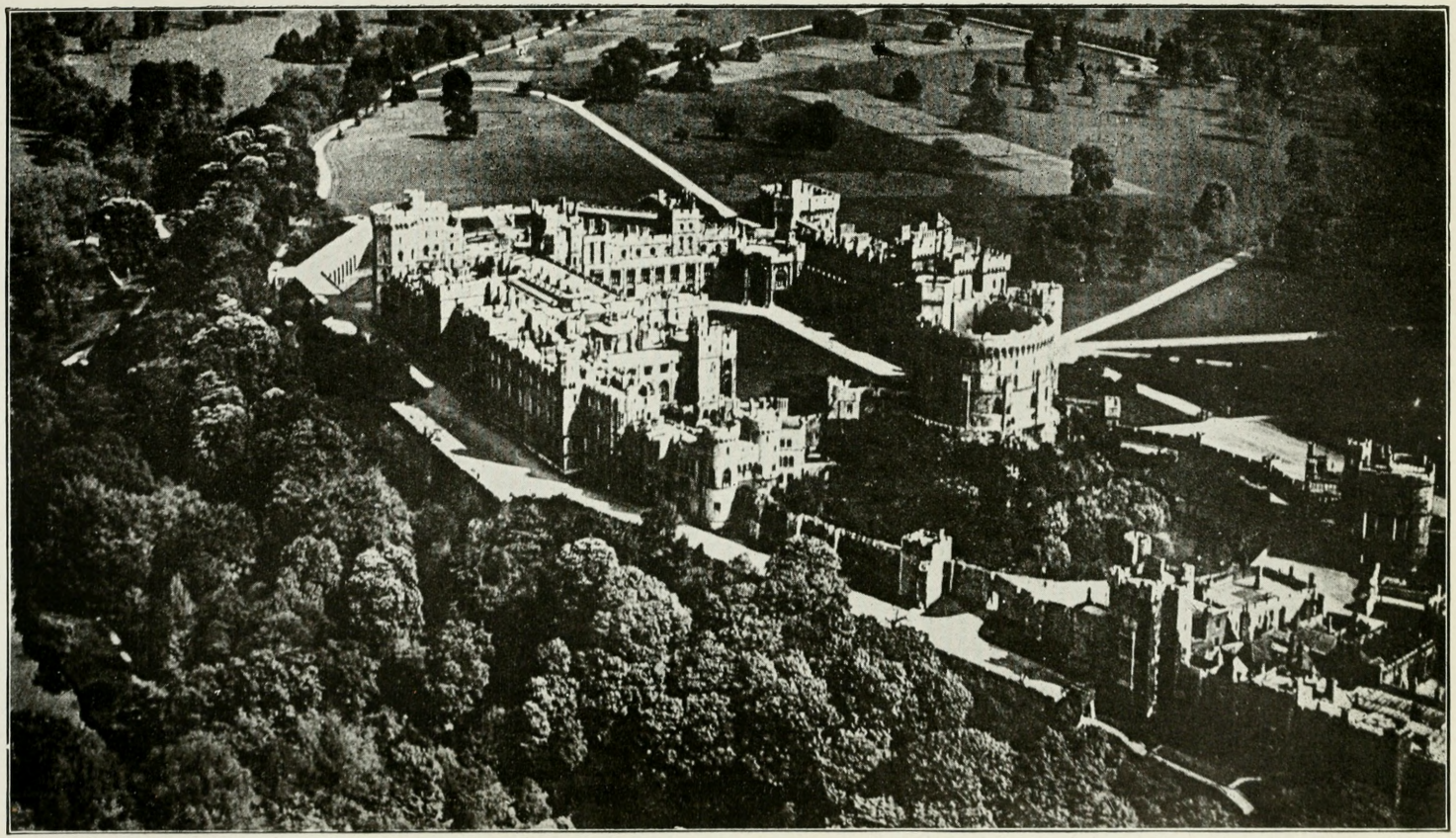
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AN AERIAL VIEW OF BUCKINGHAM PALACE, LONDON, ENGLAND



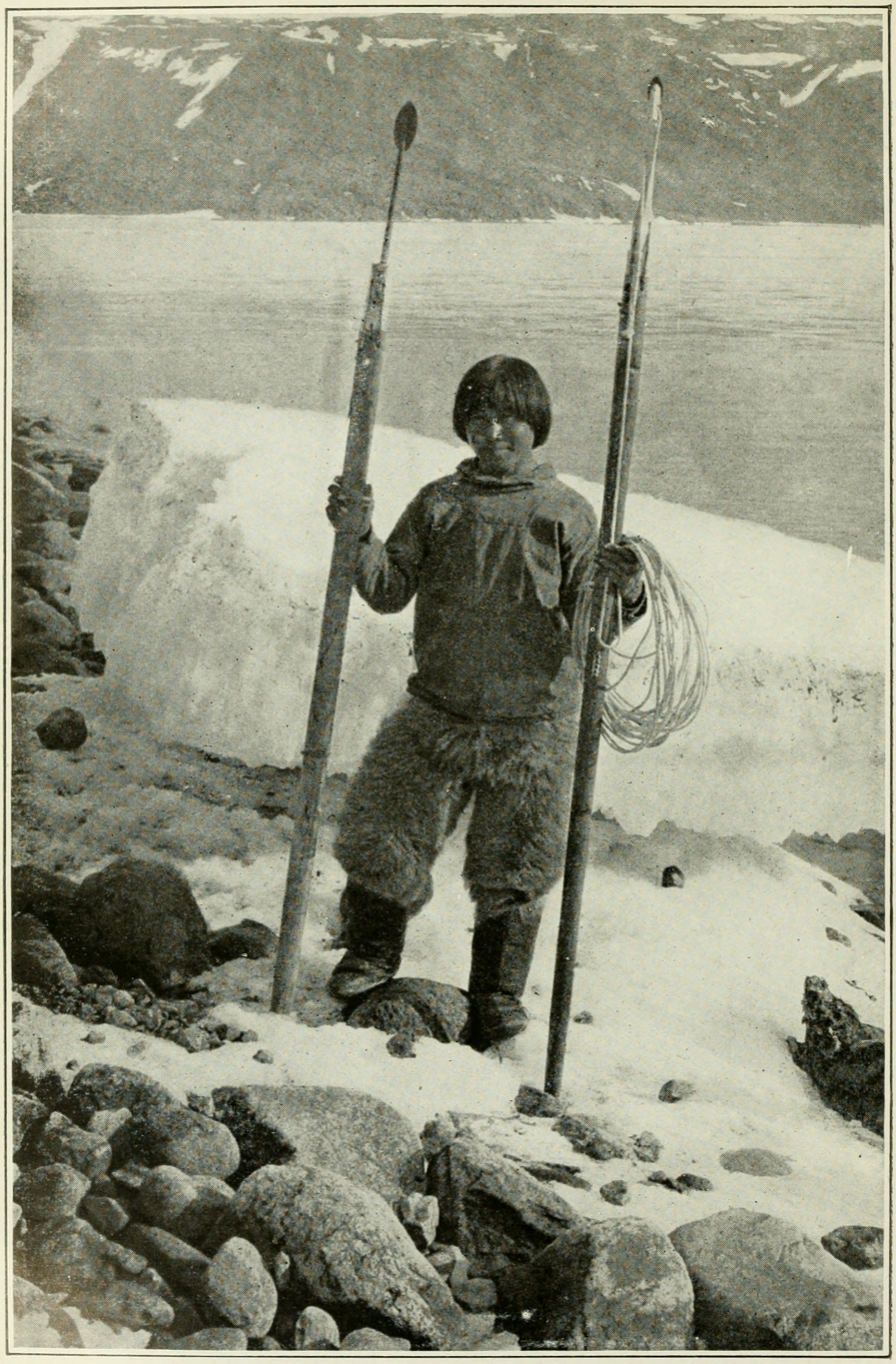
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THE KING ON THE WAY TO OPEN PARLIAMENT

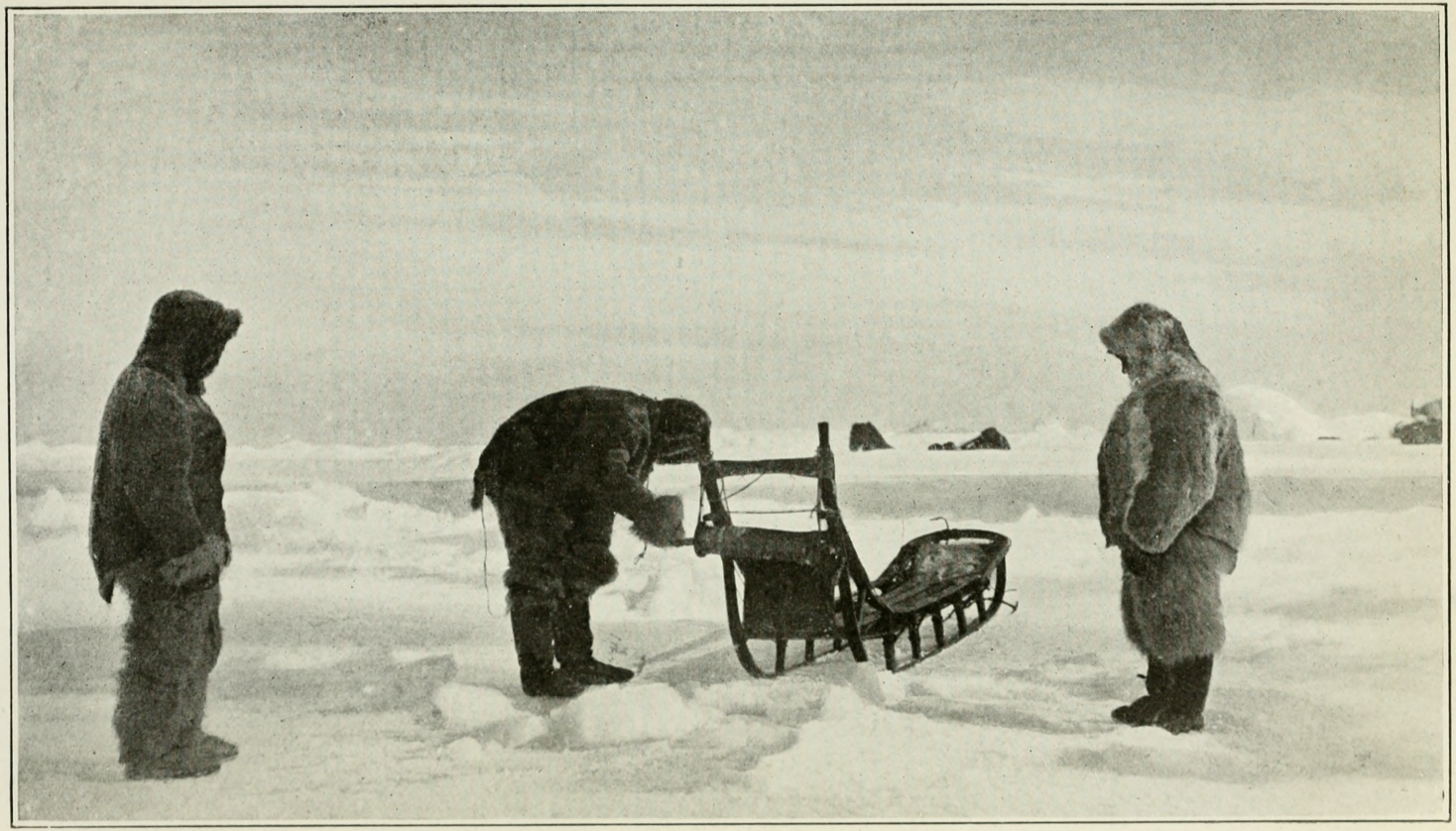


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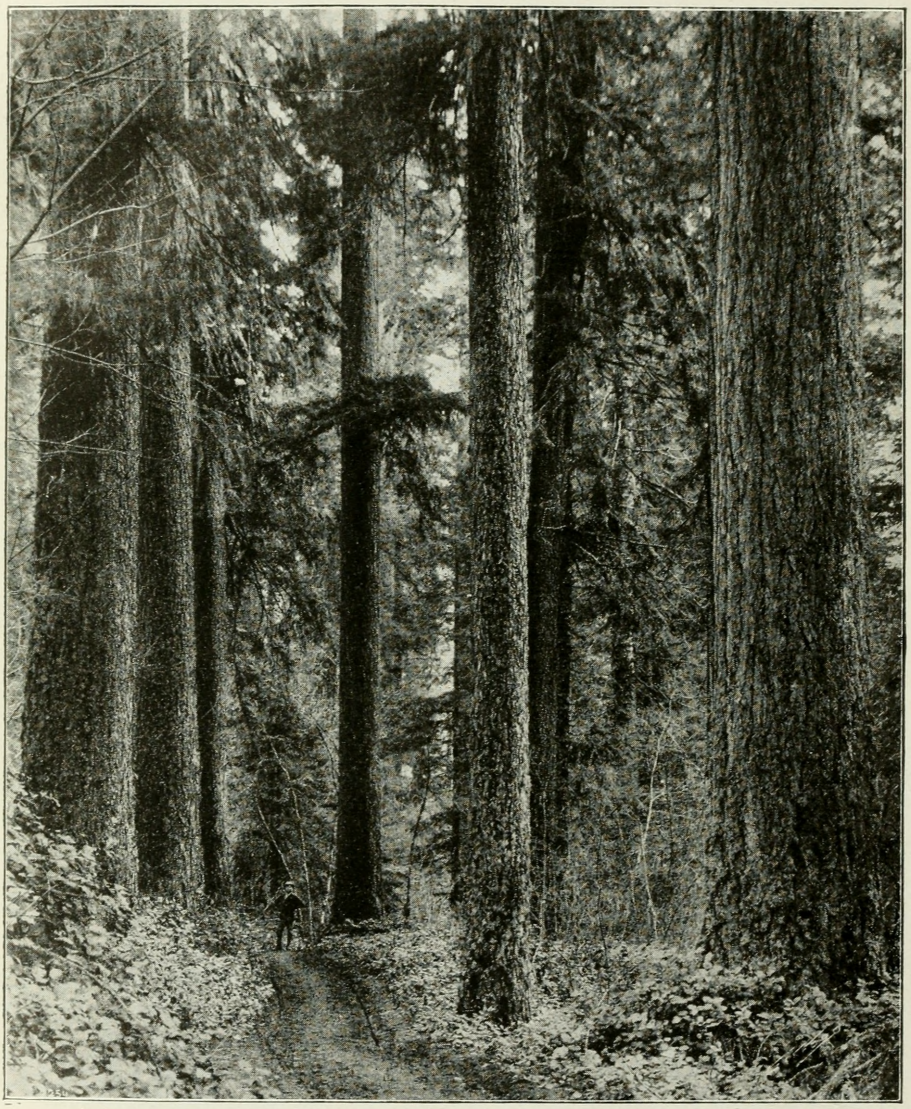
WINDSOR CASTLE, SUMMER RESIDENCE OF THE KING OF ENGLAND



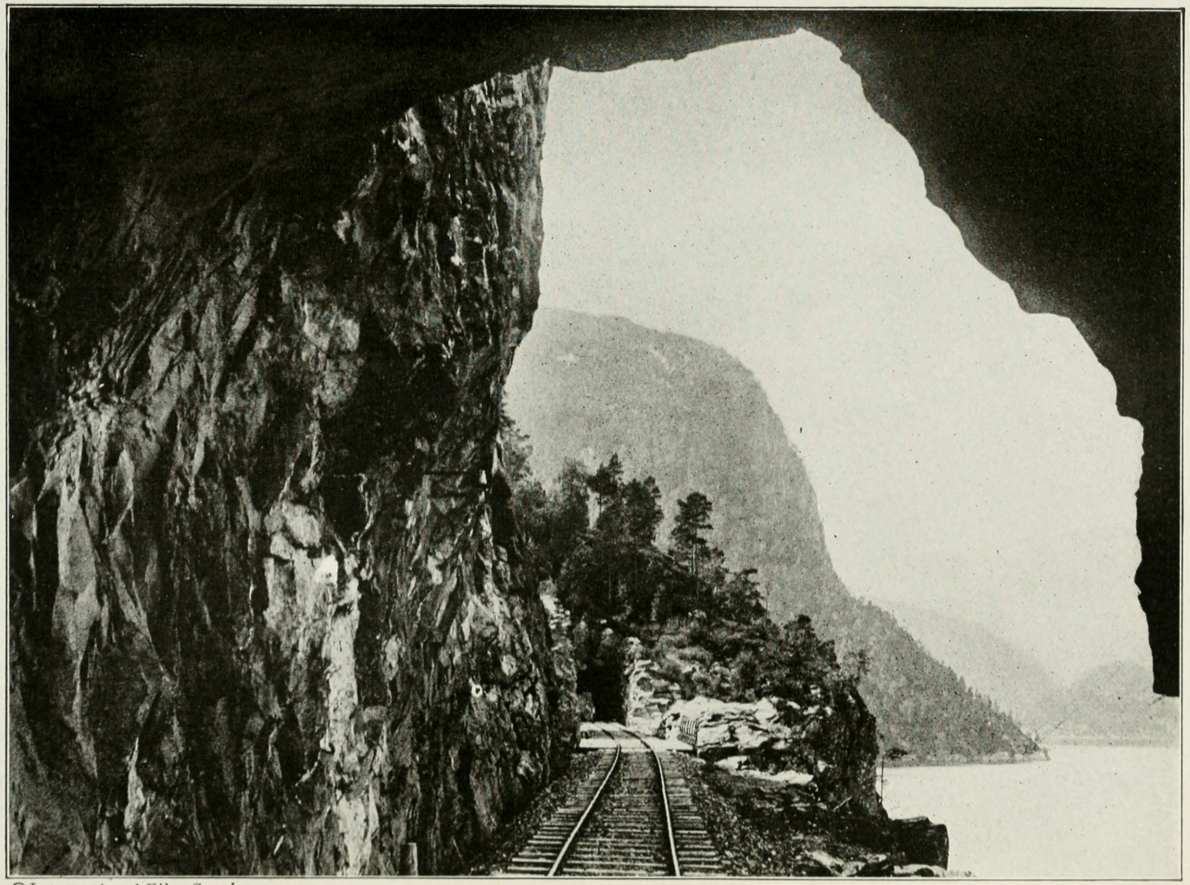
AN ESKIMO. THE HARPOONS HE USES HAVE DETACHABLE HEADS



A GROUP OF ESKIMOS WITH A DOG SLEDGE



A FOREST OF DOUGLAS FIR IN OREGON



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RAILWAY ALONG A NORWEGIAN FJORD



Photo, Ewing Galloway

SAILING BOATS AT ANCHOR AT THE DISPUTED PORT OF FIUME, ON THE ADRIATIC

or more accurately the Geez language, is the old official and ecclesiastical language of Abyssinia, introduced into that kingdom by settlers from south Arabia. In the 14th century is was supplanted as the language of the Christian Church of Abyssinia by the Amharic. It is a Semitic language resembling Aramaic and Hebrew as well as Arabic. It has a Christian literature of some importance. The principal work is a translation of the Bible, including the Old and New Testaments and Apocrypha, to which are appended some non-canonical writings, such as the "Shepherd of Hermas" and the "Book of Enoch." The language is to some extent represented by the modern dialects of Tigre, and by that spoken by some nomadic tribes of the Sultan.

ETHNOGRAPHY, the systematic description and classification of races. In recent years there has been but little distinction made between ethnology and ethnography, the general tendency being to name the science ethnology. It is a part of anthropology, and includes the studies of living non-historical peoples with a view to their classification. The studies of language and anatomy are not included in the science of ethnography. Under this heading are treated the location, movements or history of the tribe; next, its state of culture, its art, its dress and manufactures, etc. The political, social, and religious ideas should be included in the ethnology of a nation, as also some mention of the place it occupies in relation to other peoples, and its contributions to the general culture of mankind.

ETHNOLOGY, the science which treats of various races of mankind and their origin. With anthropology, philology, psychology, and sociology it helps to cover the complete study of man.

Ethnologists rely, in their different schemes of classification, on what are called ethnical criteria. These criteria are partly internal, the skeleton in general, and particularly the cranium; partly external, color of skin, color and texture of hair, and such other determining elements, whether physical or mental, as may be studied on the living subject. Of mental or intellectual criteria immeasurably the most important is language. Different phonetic systems often involve different anatomical structure of the vocal organs.

The most eminent naturalists mainly agree in classifying the whole human family in three, four, or at most five fundamental divisions; but the term fundamental is to be understood in a relative sense, for all races are necessarily regarded as belonging to a common primeval stock, constituting a single species though not sprung from a single human pair. Rather has the growth been the slow evolution of a whole anthropoid group spread over a more or less extensive geographical area, in a warm or genial climate, where the disappearance of an original hairy coat would be a relief. The difficulty of determining the exact number of these types is due to the fact, pointed out by Blumenbach, that none of them are found in what may be called ideal perfection, but that all tend to merge by imperceptible degrees in each other. They are the black, frizzly-haired Ethiopic (negro); the yellow lank-haired Mongolic; the white, smooth-haired Caucasic; the coppery, lank and long-haired American, and the brown, straight-haired Malayo Polynesian. The last is commonly rejected as evidently the outcome of a comparatively recent mixture in which the Mongolic elements predominate. Most authorities regard also the American as a remote branch of the same group; this view seems justified by the striking Mongolic features occurring in every part of the New World, as among the Utahs of the Western States and the Botocudos of eastern Brazil. The character of hair and color of skin has been used by Huxley as the basis of his classification, which divides mankind into Ulotrichi, crisp or woolly-haired people with yellow or black skin, comprising Negroes, Bushmen, and Malays; and Leiotrichi, smooth-haired people, sub-divided into Australoid, Mongoloid, Xanthochroic (fair whites), and Melanachroic (dark whites) groups. Peschel's classification, based on a number of different particulars, such as the shape of the skull, the color of the skin, the nature and color of the hair, the shape of the features, etc., is as Australians, Papuans, the Mongoloid nations, the Dravidians (aborigines of India), Hottentots, and Bushmen, Negroes, and the Mediterrean nations.

The Ethiopic group falls naturally into a Western or African and an Eastern or Oceanic division. The Western occupies all Africa from the Sahara S. and comprise a N. or Sudanese branch (African Negroes proper), and a S. or Bantu branch (more or less mixed Negro and Negroid populations). The Oceanic division of the Ethiopic group comprises four branches: (1) the Papuans of the Eastern Archipelago and New Guinea; (2) the closely allied Melanesians of the Solomon, New Hebrides, New Caledonia, Loyalty, and Fiji Archipelagoes; (3) the now extinct Tasmanians, and (4) the Australians, the most divergent of all Negro or Negroid peoples.

The Mongolic group occupies the greater part of the Eastern hemisphere and till the discovery of America was in exclusive possession of the New World. Its chief branches are (1) the Mongolo-Tartars of central and north Asia, Asia Minor, parts of Russia and the Balkan Peninsula; (2) the Tibeto-Indo-Chinese of Tibet, China proper, Japan, and Indo-China; (3) the Finno-Ugrians of Finland, Lapland, Esthonia, Middle Volga, Ural Mountains, north Siberia, Hungary; (4) the Malayo-Polynesians of the Malay Peninsula, the greater and lesser Sunda Islands, Madagascar, the Philippines, Formosa, and eastern Polynesia; (5) the American Indians, comprising all the aborigines of the New World, except the Eskimo, who with the Ainos of Yesso, form aberrant members of the Mongolic group.

The Caucasic group, called also Mediterranean because its original domain is western Asia, Europe and north Africa —*i. e.*, the lands encircling the Mediterranean Basin—has in recent times spread over the whole of the New World, south Africa, and Australasia. The chief branches are: (1) Aryans of India, Iran, Armenia, Asia Minor, and great part of Europe, with sub-branches; (2) Semites of Mesopotamia, Syria, Arabia, and north Africa, with sub-branches; (3) Hamites of north and east Africa; (4) the Caucasians proper; (5) the Basques of the western Pyrenees.

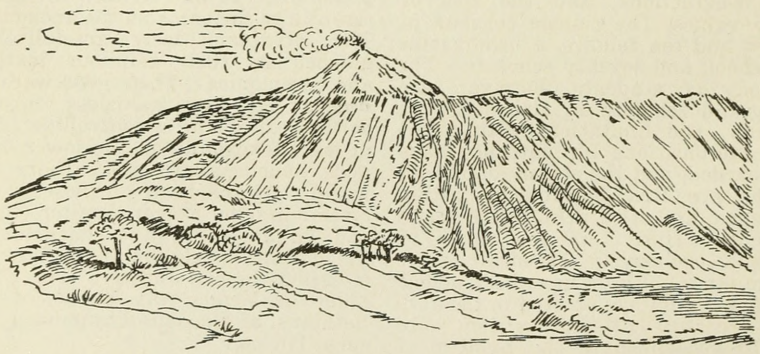
ETHYL, the radicle C_2H_5 or $CH_3—CH_2$, not known in the free state, but existing in a large number of organic compounds, such as alcohol, ether, etc. The name was given by Frankland to the compound C_4H_{10}, but this is now known as butane.

ETIENNE, ST., a town of southern France, in the department of the Loire, on the Furens, 32 miles S. W. of Lyons. The principal buildings and institutions are the cathedral, an ancient Romanesque structure; the town house, court house, exchange, communal college, mining school, gallery of arts, library, and museum. The town stands in the center of one of the most valuable mineral fields of France; and in addition to the extensive collieries, blast furnaces and other ironworks in the vicinity, has manufactures of ribbons, silks, cutlery, firearms, etc. Pop. about 150,000.

ETIOLATION, or **BLANCHING**, of plants is a state produced by the absence of light, by which the green color is prevented from appearing. It is effected artificially, as in the case of celery, by raising up the earth about the stalks of the plants; by tying the leaves together to keep the inner ones from the light; by covering with pots, boxes, or the like, or by setting in a dark place. The green color of etiolated plants may be restored by exposure to light.

ETIVE (et'iv), **LOCH**, an inlet of the sea on the W. coast of Scotland, county Argyle, nearly 20 miles long, of very unequal breadth, but at the broadest part about 1½ miles. The scenery of its shores is very beautiful. About three miles from the sea, at Connel Ferry, a ridge of sunken rocks crossing it causes a turbulent rapid, which at half-tide forms a sort of waterfall.

ETNA, or **ÆTNA, MOUNT**, the greatest volcano in Europe, a mountain



MT. ETNA, SICILY

in the province of Catania, Sicily; height, 10,874 feet. It rises immediately from the sea, has a circumference of more than 100 miles, and dominates the whole N. E. of Sicily, having a number of towns and villages on its lower slopes. The top is covered with perpetual snow; midway down is the woody or forest region; at the foot is a region of orchards, vineyards, olive groves, etc. A more or less distinct margin of cliff separates the

mountain proper from the surrounding plain; and the whole mass seems formed of a series of superimposed mountains, the terminal volcano being surrounded by a number of cones, all of volcanic origin, and nearly 100 of which are of considerable size.

The eruptions of Etna have been numerous, and many of them destructive. That of 1169 overwhelmed Catania and buried 15,000 persons in the ruins. In 1669 the lava spread over the country for 40 days, and 10,000 persons are estimated to have perished. In 1693 there was an earthquake during the eruption, when 60,000 lives were lost. Among more recent eruptions are those of 1852, 1865, 1874, 1879, 1886, 1892, 1909, and 1911.

ETNA, a borough in Pennsylvania, in Allegheny co. It is opposite Pittsburgh and on the Baltimore and Ohio and the Pennsylvania railroads. It is an important industrial center and has manufactures of furnaces, steel mills, pipe works, and other manufactures. Pop. (1910) 5,830; (1920) 6,341.

ETON COLLEGE, the largest and most famous of the old public schools of England. Founded by Henry VI. in 1440, who connected it with his foundation of King's College, Cambridge. This relationship in a modified form still obtains at the present time. Having but a small endowment at its foundation, the college has since become very wealthy by numerous benefactions, and the rise of property values. The college consists of a provost and ten fellows, a headmaster of the school, and seventy scholars. The main body of students, however, are the thousand scholars in attendance on the school. Old limitations with reference to qualifications for entrance have been discarded, and the school admits all boys who are British subjects, within certain ages, and with definite scholastic attainments. Until 1860 the course of study was exclusively classical; since that time other subjects have been added. Many of the buildings erected in the 15th century are still used, but as they were unable to accommodate the number of students who entered in the succeeding years, they have been enlarged and new structures erected. A splendid range of buildings was opened in 1908 by King Edward VII.

Many of the ancient customs have been retained by the modern school. The chief celebration of the school occurs on June 4th, King George III. birthday, on which occasion a procession of boats on the Thames takes place. Eton holds a high place in the sport of rowing, many of its graduates becoming the stars of the crew at Cambridge.

ETRURIA, the name anciently given to that part of Italy which corresponded partly with the modern Tuscany, and was bounded by the Mediterranean, the Apennines, the river Magra, and the Tiber. The name of Tusci or Etrusci was used by the Romans to designate the race of people anciently inhabiting it, but the name by which they called themselves was Rasena. These Rasena entered Italy at a very early period from the N. Etruria proper was in a flourishing condition before the foundation of Rome 753 B. C. It was known very early as a confederation of 12 great cities, each of which formed a republic of itself. Among the chief were Veii, Clusium, Volsinnii, Arretium, Cortona, Falerii, and Fæsulae. The chiefs of these republics were styled lucumones, and united the offices of priest and general. They were elected for life. After a long struggle with Rome the Etruscan power was completely broken by the Romans in a series of victories, from the fall of Veii in 396 B. C. to the battle at the Vadimonian Lake (283 B. C.).

The Etruscans had attained a high state of civilization. They carried on a flourishing commerce, and at one time were powerful at sea. They were less warlike than most of the nations around them, and had the custom of hiring mercenaries for their armies. Of the Etruscan language little is known, though more than 3,000 inscriptions have been preserved. It was written in characters essentially the same as the ancient Greek. The Etruscans were specially distinguished by their religious institutions and ceremonies. Their gods were of two orders, the first nameless, mysterious deities, exercising a controlling influence in the background on the lower order of gods, who manage the affairs of the world. At the head of these is a deity resembling the Roman Jupiter (in Etruscan Tinia). But it is characteristic of the Etruscan religion that there is also a Vejovis or evil Jupiter. The Etruscan name of Venus was Turan, of Vulcan Sethlaus, of Bacchus Phuphlans, of Mercury Turms.

Etruscan art was in the main borrowed from Greece. For articles in terra cotta, a material which they used mainly for ornamental tiles, sarcophagi, and statues, the Etruscans were especially celebrated. In the manufacture of pottery, they had made great advances; but the most of the painted vases popularly known as Etruscan are undoubtedly productions of Greek workmen. The skill of the Etruscans in works of metal is attested by ancient writers, and also by numerous extant specimens, such as necklaces, ear-rings, bracelets, etc. The

Etruscans showed great constructive and engineering skill. They were acquainted with the principle of the arch, and the massive ruins of the walls of their ancient cities still testify to the solidity of their constructions. Various arts and inventions were derived by the Romans from the Etruscans.

ETRURIA, KINGDOM OF, in Italy, founded by Napoleon I. in 1801. Its capital was Florence. In 1807 Napoleon incorporated it with the French empire.

ETTRICK, a district of Scotland, in Selkirk, through which the Ettrick water runs. It is now a sheep pasture denuded of wood, but anciently formed part of Ettrick Forest, which included the whole county as well as parts of Peebles and Edinburghshire. The "Ettrick Shepherd," James Hogg, was a native of this district.

ETTY, WILLIAM, an English painter; born in 1787. He studied at the Royal Academy. He worked long without much recognition, but at length in 1820 he won public notice by his "Coral Finders." In 1828 he was elected an academician. Among his works are a series of three pictures (1827-1831) illustrating the "Deliverance of Bethulia by Judith," "Benaiah one of David's Mighty Men," "Women Interceding for the Vanquished." All are now in the National Gallery of Scotland. Others of note are "The Judgment of Paris," "The Rape of Proserpine," "Youth at the Prow," and "Pleasure at the Helm." He died in 1849.

ETYMOLOGY, a term applied to that part of grammar which treats of the various inflections and modifications of words and shows how they are formed from simple roots; and to that branch of philology which traces the history of words from their origin to their latest form and meaning. Etymology in this latter sense, or the investigation of the origin and growth of words, is among the oldest of studies. It was not till modern times, and particularly since the study of Sanskrit, that etymology has been scientifically studied. Languages then began to be properly classed in groups and families, and words were studied by a comparison of their growth and relationship in different languages. It was recognized that the development of language is not an arbitrary or accidental matter, but proceeds according to general laws. The result was a great advance in etymological knowledge and the formation of a new science of philology.

EUBŒA (ū-bē'ä), formerly called Negropont, a Greek island, the second largest island of the Ægean Sea. It is 90 miles long, 30 in greatest breadth, reduced at one point to 4 miles. It is separated from the mainland of Greece by the narrow channels of Egripo and Talanta. It is connected with the Bœotian shore by a bridge. There are several mountain peaks over 2,000 feet, and one over 7,000 feet. The island is well-wooded and remarkably fertile. Wine is a staple product, and cotton, wool, pitch, and turpentine are exported. The chief towns are Chalcis and Karyst. The island was anciently divided among seven independent cities, the most important of which were Chalcis and Eretria, and its history is for the most part identical with that of those two cities. With some small islands it forms a modern nomarchy, with a population of about 100,000.

EUCALYPTUS, a genus of trees, mostly natives of Australia, and remarkable for their gigantic size, some of them attaining the height of 480 or 500 feet. In the Australian colonies they are known by the name of gum trees, from the gum which exudes from their trunks; and some of them have also such names as "stringy bark," "iron bark," etc. The wood is excellent for shipbuilding and such purposes.

EUCHARIST (ū'ka-rist), a name for the sacrament of the Lord's Supper, in reference to the blessing and thanksgiving which accompany it.

EUCHER (ū'ker), the most generally played parlor game after whist in the United States. The pack of cards consists of 32, being an ordinary "deck," minus the deuce, trey, four, five, and six spots of each suit. The game is usually played by two, three, or four persons, the most interesting party being four, two playing on each side as partners. When choice of partners and first dealer shall have been decided (as at whist, or in any other mode agreed on), five cards are dealt, usually two at once, then three, or the contrary. In throwing around for partners and dealers the holder of the best cards deals. The cards rank in value as follows: The best eucher card is the knave of trumps; the second best is the knave of the suit of the same color as the trump. The former card is called the "right bower," the latter the "left bower." After the right and left bowers the cards rank as at whist, the knaves of the color not turned as trumps falling into their regular place as at whist. The object of the game is to take tricks. The score is five points, unless otherwise agreed. The non-dealer may "pass," or "order up" the trump. Should he pass, then the

dealer may take up the trump and discard. In that case the dealer must make three tricks or be "euchered," which counts two points for the adversary, but if he makes the three tricks (or four), he counts one point. Should he make all five tricks, it is termed "a march," and counts him two on the score. The non-dealer has the first lead, after which he who takes the trick leads. Should the non-dealer "order up" the trump he must make three tricks or be "euchered," which counts two for his opponent; if he win three tricks (or four), having ordered up the trump, he scores one point. Should he make "a march," he scores two. If both players pass (the dealer turning down the trump), and then both decline to make a trump, there must be a new deal. Either party naming a new suit for trump must make the three tricks or be "euchered."

EUCLID, a celebrated mathematician, who collected all the fundamental principles of pure mathematics, which had been delivered down by Thales, Pythagoras, Eudoxus, and other mathematicians before him, which he digested into regularity and order, with many others of his own, on which account he is said to have been the first who reduced arithmetic and geometry into the form of a science. He lived about 277 B. C., and taught mathematics in Alexandria.

EUDOXIANS, followers of Eudoxius, who from A. D. 347 was Bishop of Antioch, in Syria, and from 360 to his death in 370 Bishop and Patriarch of Constantinople. He was successively an Arian, a Semi-Arian and an Aëtian. Respecting the Trinity, he believed the will of the Son to be differently affected from that of the Father.

EUGENE, a city of Oregon, the county-seat of Lane co. It is on the Southern Pacific, the Oregon Electric, and the Portland, Eugene and Eastern railroads. It is the center of an extensive agricultural region, and the lumbering industry is also important. Its industrial establishments include canneries, flour mills, woolen mills, machine shops, etc. It is the seat of the University of Oregon and the Eugene Bible University. It has a public library and other public buildings. Pop. (1910) 9,009; (1920) 10,593.

EUGÈNE (ü-jēn'), or **FRANÇOIS EUGÈNE**, Prince of Savoy, fifth son of Eugène Maurice, Duke of Savoy-Carignan, and Olympia Mancini, a niece of Cardinal Mazarin; born in Paris, Oct. 18, 1663. Offended with Louis XIV. he entered the Austrian service in 1683, serving his first campaign as a volunteer against the Turks. Here he distinguished himself so much that he received a regiment of dragoons. Later, at the sieges of Belgrade and Mayence, he increased his reputation, and on the outbreak of the war between France and Austria he received the command of the imperial forces sent to Piedmont to act in conjunction with the troops of the Duke of Savoy. At the end of the war he was sent as commander-in-chief to Hungary, where he defeated the Turks at the battle of Zenta (Sept. 11, 1697).

The Spanish war of succession brought Eugène again into the field. In northern Italy he outmaneuvered Catinat and Villeroi, defeating the latter at Cremona (1702). In 1703 he commanded the imperial army in Germany, and in co-operation with Marlborough frustrated the plans of France and her allies. In the battle of Höchstadt or Blenheim, Eugène and Marlborough defeated the French and Bavarians under Marshal Tallard, Aug. 13, 1704. Next year Eugène, returning to Italy, forced the French to raise the siege of Turin, and in one month drove them out of Italy. During the following years he fought on the Rhine, took Lille, and, in conjunction with Marlborough, defeated the French at Oudenarde (1708), and Malplaquet (1709), where he himself was dangerously wounded. After the recall of Marlborough, which Eugène opposed in person at London, without success, and the defection of England from the alliance against France, his farther progress was in a great measure checked. In the war with Turkey, in 1716, Eugène defeated two superior armies at Peterwardein and Temesvar, and, in 1717, took Belgrade, after having gained a decisive victory over a third army that came to its relief.

During 15 years of peace which followed, Eugène served Austria as faithfully in the cabinet as he had done in the field. He was one of the great generals of modern times. He died in Vienna, April 21, 1736.

EUGENIA (so named in honor of Prince Eugène), a genus of dicotyledonous polypetalous plants of the natural order *Myrtaceæ*, nearly related to the myrtle. It contains numerous species, some of which produce delicious fruits. The allspice or pimento is the berry of the *E. Pimenta*. *E. acris* is the wild clove.

EUGENIC ACID, or **EUGENOL**, an acid derived from cloves, and conferring on them their essential properties.

EUGENICS, a term introduced by Francis Galton in 1883 and defined by him as follows: "Eugenics is the study of agencies under social control which

may improve or impair the racial qualities of future generations either physically or mentally." It is based upon genetics or the study of heredity, a science open to experimental methods, in which great advance in knowledge has been attained; eugenics seeks to apply this knowledge to the improvement of the human stock by selection in mating. The study of genetics has shown that the qualities which influence heredity are contained in the chromatin of the nucleus of the male and female germ cell; that in fertilization there is intermingling of the chromatin, and the ovum from which the development of the embryo proceeds contains the qualities of both parents. The substances contained in chromatin and which influence development are called determinants and in certain directions their influence is predictable. There are certain unit characters such as color and form of hair in animals, color in flowers, etc., which are transmitted to the offspring with certainty, appearing in the first generation, when they are termed dominant or in the second generation when they are termed recessive. White and black guinea pigs when mated produce black offspring, the black being dominant, and in the second generation one in every four of the offspring will be white, the white color being recessive. This is known as Mendelian inheritance, and was described by Mendel in 1865, whose work remained unknown until 1906, when the law and the former publication of Mendel were rediscovered. There are similar unit characters in man which are transmitted with equal certainty and if it were desirable to produce a race marked by excessive fingers (polydactylism) or webbed fingers (syndactylism) it would be possible by selective mating to do so. There are also certain unit characters which are linked with sex, appearing in males and transmitted by females who do not have the condition which is recessive. Thus hæmophilia, or tendency to bleeding, affects males only, but is transmitted by females. In addition to this Mendelian inheritance in which there is no blending of character, there is another form in which characters such as general body size, stature, skin color, are blended in the offspring. Great results have been attained in the breeding of domestic animals, strains being developed marked by certain qualities which are desirable, such as milk production, fat formation, wool production, etc. All these animals are bred under strictly artifical conditions, and it is not probable that the qualities arrived at would be advantageous for animals in a natural state. It has also been ascertained that only the qualities resident in the germ affect heredity and that qualities which are acquired and due to environment are not inherited. While this is true, environmental conditions are probably of equal importance for the improvement of a race, with the character of the germ plasm, for a good environment may render possible the development of qualities which in another environment might be suppressed. The most important qualities which affect man in his social relations are the mental, such as general mental ability, temperament, memory, musical, literary, artistic and mathematical ability, and these are undoubtedly subject to inheritance, but to an unknown extent. With regard to the inheritance of disease there is a surer foundation. There is no inheritance of the infectious diseases, though there may be infection of the male or female germ cell or infection of the fœtus by the mother before birth, resulting in congenital disease. Or disease of the parents may affect not the germinal material of the germ cell, but the general character of the cellular material, resulting in a general imperfection of offspring. Syphilis may affect the offspring in any of these ways and it should constitute a bar against mating. Great interest attaches to the inheritance of such conditions as insanity, epilepsy, and feeble-mindedness. These may be due to conditions which are acquired and are not inheritable, but when due to a congenital imperfection of the nervous material they are inheritable to a high degree. These diseases are of such enormous social importance in increasing the number of defectives which burden a state that mating among them should be forbidden. Certain states have passed laws requiring the sterilization of males and females so affected, but it is difficult to have such laws carried out, and they are opposed to the moral sense of the people. Segregation with separation of the sexes is much more desirable, but in asylums it is difficult or impossible to have this so effectively done as to include the milder forms of these diseases which may be just as disadvantageous for breeding. There are certain forms of criminality which depend upon qualities which may be transmitted, and breeding from these should be prohibited, but the interdiction should not include all those who come under the ban of the law. A fine population has arisen from the criminals whom England formerly transported to her colonies. The desire to improve the race is a laudable one, but there is great uncertainty as to measures. The prevention of descent from those with such defects of both mind and body as are inheritable and disad-

vantageous to the social environment, or with such diseases as syphilis, is a measure the advantage of which cannot be disputed. One great difficulty is to ascertain in what direction other than health we should seek to improve the race. The stratification of society is based not upon the biological qualities of the germ plasm, but upon environmental conditions. Alarm has been felt that in number of offspring the cultivated and upper classes were at a great disadvantage as compared with the lower. Cattell has shown that a Harvard graduate has three-fourths of a son, and a Vassar graduate one-half of a daughter. Such a declining birth rate is due to late marriage and voluntary restriction of offspring dictated by motives of love of luxury, and fear, and these qualities are not of advantage to a race. It is not probable that in bodily strength and mental ability we are superior to primitive man and it has never been shown that an upper class in society is better biological material than a lower. Above all in Eugenics there is need of more extended and certainly more exact knowledge of heredity in man before any general measures looking toward the improvement of the race can be undertaken with expectation of success.

EUGÉNIE (e-zhā-nē′) (maiden name, Marie de Guzman), ex-empress of the French; born in Granada, Spain, in



EMPRESS EUGÉNIE

1826. Her father, the Count de Montijo, was of a noble Spanish family; her mother was of Scotch extraction, maiden name Kirkpatrick. On Jan. 29, 1853, she became the wife of Napoleon III. and Empress of the French. On March 16, 1856, a son was born of the marriage. When the war broke out with Germany she was appointed regent (July 27, 1870) during the absence of the emperor, but on Sept. 4 the revolution forced her to flee from France. She went to England, where she was joined by the prince imperial and afterward by the emperor. Camden House, Chislehurst, became the residence of the imperial exiles. On Jan. 9, 1873, the emperor died, and six years later the prince imperial was slain while with the English army in the Zulu war. In 1881 the empress transferred her residence to Farnborough in Hampshire. She died in 1920.

EUGENIUS, the name of four Popes. EUGENIUS I., elected Sept. 8, 654, while his predecessor, Martin I., was still living; died in 657 without having exerted any material influence on his times. EUGENIUS II. held the see from 824-827. EUGENIUS III., born in Pisa, was a disciple of St. Bernard of Clairvaux. He was raised to the papacy at Farfa, in 1145, having been obliged to quit Rome in consequence of the commotions caused by Arnold of Brescia; through negotiations by Frederick Barbarossa, he was enabled to return in 1152, and died in 1153. EUGENIUS IV., from Venice, originally called Gabriel Condolmero, was raised to the papacy in 1431. In consequence of his opposition to the council of Basel he was deposed. He died in 1447.

EULENSPIEGEL (oi′len-spē-gl), **TILL**, a name which has become associated in Germany with all sorts of wild, whimsical frolics, and with many amusing stories. Some such popular hero of tradition and folklore seems to have really existed in Germany, probably in the first half of the 14th century, and a collection of popular tales of a frolicsome character, originally written in Low German, purports to contain his adventures. The earliest edition of such is a Strassburg one of the year 1515 in the British Museum. Better known, however, is that of 1519, published also at Strassburg by Thomas Mürner.

EUPATORIA, a city in the former Russian province of Taurida, on the W. coast of the Crimea, on an inlet of the Black Sea forming a good harbor. It has been one of the bases of operation of the Anti-Bolshevik armies, first under General Denikine, and later, in 1920, under General Wrangel. Pop. about 30,000.

EUPEN, formerly a city of Prussia, ten miles from Aix-la-Chapelle, and two miles from the Belgian frontier, in the

Rhine province. As a result of the Peace Treaty of Versailles the city with the district of which it was the capital was transferred to Belgium. It is famous for its iron foundries, woolen and cloth mills, and its breweries. Pop. about 13,500.

EUPHORBUS, the son of Panthous, slain by Menelaus in the Trojan war.

EUPHRATES (-frā'tēz), or **EL FRAT**, a celebrated river of western Asia, in Asiatic Turkey, having a double source in two streams rising in the Anti-Taurus range. Its total length is about 1,700 miles, and the area of its basin 260,000 square miles. It flows mainly in a S. E. course through the great alluvial plains of Babylonia and Chaldæa till it falls into the Persian Gulf by several mouths, of which only one in Persian territory is navigable. About 100 miles from its mouth it is joined by the Tigris, when the united streams take the name of Shatt-el-Arab.

EUPHUISM, an affected style of speech which distinguished the conversation and writings of many of the wits of the court of Queen Elizabeth. The name and the style were derived from the "Euphues, the Anatomy of Wit," (about 1580), of John Lyly, (about 1554-1606).

EURASIANS (syncopated from Europ-Asians), a name sometimes given to the "half-castes" of India, the offspring of European fathers and Indian mothers. They are particularly common in the three presidential capitals — Calcutta, Madras, and Bombay. They generally receive a European education, and the young men are often engaged in government or mercantile offices. The girls, in spite of their dark tint, are generally very pretty and often marry Europeans.

EURE (er), a river of France, which rises in the department of the Orne, and falls into the Seine after a course of 124 miles, being navigable for about half the distance. It gives its name to a department in the N. W. of France, forming part of Normandy; area, 2,300 square miles. The surface consists of an extensive plain, intersected by rivers, chief of which is the Seine. Almost the whole surface is profitably occupied, the waste not amounting to one-thirtieth of the whole. Apples, pears, plums, and cherries form important crops, and a little wine is produced. The mining and manufacturing industries are extensive, and the department has a considerable trade in woolen cloth, linen and cotton fabrics, carpets, leather, paper, glass, and stoneware. Evreux is the capital. Pop. about 330,000.

EURE-ET-LOIR (er ā lwär), a department in the N. W. of France, forming part of the old provinces of Orléannais and Ile-de-France; area, 2,267 square miles. A ridge of no great height divides the department into a N. and a S. basin, traversed respectively by the Eure and the Loire. The soil is extremely fertile, and there is scarcely any waste land. A considerable portion is occupied by orchards and vineyards, but the greater part is devoted to cereal crops. The department is essentially agricultural, and has few manufactures. The capital is Chartres. Pop. about 275,000.

EUREKA, a city and county-seat of Humboldt co., Cal., on Humboldt bay, and on the Northwestern and Pacific railroad; 225 miles N. W. of San Francisco. It has a fine harbor, which has been improved by the United States government on the jetty plan. The city is situated in the famous redwood region, and has large lumber interests. Sequoia Park, a tract of 20 acres of virgin redwood forest, is near the city. The city has gas and electric lights, high schools, daily and weekly newspapers. Pop. (1910) 11,854; (1920) 12,923. See BIG TREES.

EUREKA COLLEGE, a coeducational institution in Eureka, Ill.; founded in 1855 under the auspices of the Christian Church; reported at the close of 1919: Professors and instructors, 23; students, 383; president, L. O. Lehmar.

EURIPIDES (-rip'i-dēz), a celebrated Athenian tragedian; born in Salamis, in 480 B. C. (or 485). He studied under Prodicus and Anaxagoras, and is said to have begun to write tragedies at the age of 18, although his first published play, the "Peliades," appeared only in 455 B. C. He was not successful in gaining the first prize till the year 441 B. C., and he continued to exhibit till 408 B. C., when he exhibited the "Orestes." The violence of unscrupulous enemies, who accused him of impiety and unbelief in the gods, drove Euripides to take refuge at the court of Archelaus, King of Macedonia, where he was held in the highest honor. Euripides is a master of tragic situations and pathos, and shows much knowledge of human nature and skill in grouping characters, but his works lack the artistic completeness and the sublime earnestness that characterize Æschylus and Sophocles. Euripides is said to have composed 75, or according to another authority 92 tragedies. Of these 18 (or 19, including the "Rhesus") are extant, viz.: "Alcestis," "Medea," "Hippolytus," "Hecuba," "Heracleidæ,"


EUROPE
EASTERN PART
SCALE OF STATUTE MILES
0 50 100 200 300 400
SCALE OF KILOMETERS
0 50 100 200 300 400
ARCTIC OCEAN
MEDITERRANEAN SEA
BLACK SEA
SEA OF AZOV
Kara Sea
White Sea
Gulf of Finland
Gulf of Bothnia
Baltic Sea
North Sea
Caspian Sea
Aral Sea
Syrian Desert
Arabian Desert
Persian Gulf
Red Sea
Caucasus Mts.
Ural Mts.
Carpathian Mts.
Pyrenees Mts.
Alps
Apennines
Dinaric Alps
Balkan Mts.
Taurus Mts.
Lebanon Mts.
Anti-Lebanon Mts.
Elburz Mts.
Kopet Dagh
Hindu Kush
Pamir
Tien Shan
Altai Mts.
Sayan Mts.
Stanovoy Range
Verkhoyansk Range
Kamchatka Peninsula
Sea of Okhotsk
Sea of Japan
Yellow Sea
Bering Strait
Kuril Islands
Sakhalin
Hokkaido
Honshu
Kyushu
Ryukyu Islands
Taiwan
Philippine Islands
Luzon
Mindanao
Sulu Archipelago
Celebes Sea
Java Sea
Timor Sea
Arafura Sea
Coral Sea
Tasman Sea
New Zealand
North Island
South Island
Australia
Tasmania
Great Australian Bight
Gulf of Carpentaria
Arnhem Land
Great Sandy Desert
Great Victoria Desert
Gibson Desert
Simpson Desert
Tanami Desert
Great Dividing Range
Murray River
Darling River
Lake Eyre
Lake Torrens
Lake Gairdner
Lake Amadeus
Lake Mackay
Lake Disappointment
Lake Frome
Lake Callabonna
Lake Blanche
Lake Hope
Lake Yamma Yamma
Lake Bancannia
Lake Gregory
Lake Macleod
Lake Barlee
Lake Ballard
Lake Carnegie
Lake Rason
Lake Wells
Lake Dora
Lake Mackay
Lake Nash
Lake Nash
Lake Nash

"Suppliants," "Ion," Hercules Furens," "Andromache," "Troades," "Electra," "Helena," "Iphigenia Among the Tauri," "Orestes," "Phœnissæ," "Bacchæ," "Iphigenia at Aulis," and "Cyclops."

EUROPA (-rō-pä), in Greek mythology, the daughter of Agenor, King of the Phœnicians, and the sister of Cadmus. The fable relates that she was abducted by Jupiter, who for that occasion had assumed the form of a bull, and swam with his prize to the island of Crete. Here Europe bore to him Minos, Sarpedon, and Rhadamanthus.

EUROPE, the smallest of the great continents, but the most important in the history of civilization for the last 2,000 years. It forms a huge peninsula projecting from Asia, and is bounded on the N. by the Arctic Ocean; on the W. by the Atlantic Ocean; on the S. by the Mediterranean, the Black Sea, and the Caucasus range; on the E. by the Caspian Sea, the Ural River, and the Ural Mountains. The most northerly point on the mainland is Cape Nordkyn, in Lapland, lat. 71°6′; the most southerly points are Punta da Tarifa, lat. 36° N., in the Strait of Gibraltar, and Cape Matapan, lat. 36° 17′, which terminates Greece. The most westerly point is Cape Roca in Portugal, in lon. 9° 28′ W., while Ekaterinburg is in lon. 60° 36′ E. From Cape Matapan to North Cape is a direct distance of 2,400 miles, from Cape St. Vincent to Ekaterinburg, N. E. by E., 3,400 miles; area of the continent, about 3,800,000 square miles. Great Britain and Ireland, Iceland, Nova Zembla, Corsica, Sardinia, Sicily, Malta, Crete, the Ionian and the Balearic Islands are the chief islands of Europe. The shores are very much indented, giving Europe an immense length of coast line (estimated at nearly 50,000 miles). The chief seas or arms of the sea are: The White Sea on the N.; the North Sea or German Ocean, on the W., from which branches off the great gulf or inland sea known as the Baltic; the English Channel, between England and France; the Mediterranean, communicating with the Atlantic by the Strait of Gibraltar (at one point only 19 miles wide); the Adriatic and Archipelago, branching off from the Mediterranean, and the Black Sea, connected with the Archipelago through the Hellespont, Sea of Marmora, and Bosporus.

Surface.—The mountains form several distinct groups or systems of very different geological dates, the loftiest mountain masses being in the S. central region. The Scandinavian mountains in the N. W., to which the great northern peninsula owes its form, extend above 900 miles from the Polar Sea to the S. point of Norway. The highest summits are about 8,000 feet. The Alps, the highest mountains in Europe (unless Mount Elbruz in the Caucasus is claimed as European), extend from the Mediterranean first in a northerly and then in an easterly direction, and attain their greatest elevation in Mont Blanc (15,781 feet), Monte Rosa, and other summits. Branching off from the Alps, though not geologically connected with them, are the Apennines, which run S. E. through Italy, constituting the central ridge of the peninsula. The highest summit is Monte Corno (9,541 feet). Mount Vesuvius, the celebrated volcano in the S. of the peninsula, is quite distinct from the Apennines. By southeastern extensions the Alps are connected with the Balkan and the Despoto-Dagh of the southeastern peninsula of Europe. Among the mountains of southwestern Europe are several massive chains, the loftiest summits being in the Pyrenees, and in the Sierra Nevada in the S. of the Iberian Peninsula. The highest point in the former, La Maladetta or Mount Maudit, has an elevation of 11,165 feet; Mulahacen, in the latter, is 11,703 feet, and capped by perpetual snow. West and N. W. of the Alps are the Cevennes, Jura, and Vosges; N. and N. E., the Harz, the Thüringerwald Mountains, the Fichtelgebirge, the Erzgebirge and Böhmerwaldgebirge. Farther to the E. the Carpathian chain incloses the great plain of Hungary, attaining an elevation of 8,000 or 8,500 feet. The Ural Mountains between Europe and Asia reach the height of 5,540 feet. Besides Vesuvius other two volcanoes are Etna in Sicily, and Hecla in Iceland. A great part of northern and eastern Europe is level. The "great plain" of north Europe occupies part of France, western and northern Belgium, Holland, the northern provinces of Germany, and the greater part of Russia. The other great plains of Europe are the plain of Lombardy and the plain of Hungary. Part of southern and southeastern Russia consists of steppes.

Rivers and Lakes.—The main European watershed runs in a winding direction from S. W. to N. E., at its northeastern extremity being of very slight elevation. From the Alps descend some of the largest of the European rivers, the Rhine, the Rhône, and the Po, while the Danube, a still greater stream, rises in the Black Forest N. of the Alps. The Volga, which enters the Caspian Sea, an inland sheet without outlet, is the longest of European rivers, having a direct length of nearly 1,700 miles, in-

cluding windings 2,400 miles. Into the Mediterranean flow the Ebro, the Rhône, and the Po; into the Black Sea, the Danube, Dnieper, Dniester, and Don (through the Sea of Azov); into the Atlantic, the Guadalquivir, the Guadiana, the Tagus, and Loire; into the English Channel, the Seine; into the North Sea, the Rhine, Elbe; into the Baltic, the Oder, the Vistula, and the Duna; into the Arctic Ocean, the Dwina. The lakes of Europe may be divided into two groups, the southern and northern. The former run along both sides of the Alps, and among them, on the N. side, are the lakes of Geneva, Neuchâtel, Thun, Lucerne, Zürich, and Constance; on the S. side, Lago Maggiore, and the lakes of Como, Lugano, Iseo, and Garda. The northern lakes extend across Sweden from W. to E., and on the E. side of the Baltic a number of lakes, stretching in the same direction across Finland on the borders of Russia, mark the continuation of the line of depression. It is in Russia that the largest European lakes are found—Lakes Ladoga and Onega.

Geology.—The geological features of Europe are exceedingly varied. The older formations prevail in the northern part as compared with the southern half and the middle region. N. of the latitude of Edinburgh and Moscow there is very little of the surface of more recent origin than the strata of the Upper Jura belonging to the Mesozoic period, and there are vast tracts occupied either by eruptive rocks or one or other of the older sedimentary formations. Denmark and the portions of Germany adjoining belong to the Cretaceous period, as does also a large part of Russia between the Volga and the basin of the Dnieper. Middle and eastern Germany with Poland and the valley of the Dnieper present on the surface Eocene formations of the Tertiary period. Europe possesses abundant stores of those minerals which are of most importance to man, such as coal and iron, Great Britain being particularly favored in this respect. Coal and iron are also obtained in France, Belgium and Germany. The richest silver ores are in Norway, Spain, the Erzgebirge, and the Harz Mountains. Spain is also rich in quicksilver. Copper ores are abundant in the Ural Mountains, Thuringia, Cornwall, and Spain. Tin ores are found in Cornwall, the Erzgebirge, and Brittany.

Climate.—Several circumstances concur to give Europe a climate peculiarly genial, such as its position almost wholly within the temperate zone, and the great extent of its maritime boundaries. Much benefit is also derived from the fact that its shores are exposed to the warm marine currents and warm winds from the S. W., which prevent the formation of ice on most of its northern shores. The eastern portion has a less favorable climate than the western. The extremes of temperature are greater, the summer being hotter and the winter colder, while the lines of equal mean temperature decline S. as we go E.

Vegetable Productions.—With respect to the vegetable kingdom Europe may be divided into four zones. The first, or most northern, is that of fir and birch. The birch reaches almost to North Cape; the fir ceases a degree farther S. The cultivation of grain extends farther N. than might be supposed. Barley ripens even under the 70th parallel of N. latitude; wheat ceases at 64° in Norway, 62° in Sweden. Within this zone, the southern limit of which extends from lat. 64° in Norway to lat. 62° in Russia, agriculture has little importance, its inhabitants being chiefly occupied with the care of reindeer or cattle, and in fishing. The next zone, which may be called that of the oak and beech, and cereal produce, extends from the limit above mentioned to the 48th parallel. The Alps, though beyond the limit, by reason of their elevation belong to this zone, in the moister parts of which cattle husbandry has been brought to perfection. Next we find the zone of the chestnut and vine, occupying the space between the 48th parallel and the mountain chains of southern Europe. Here the oak still flourishes, but the pine species become rarer. Rye, which characterizes the preceding zone on the Continent, gives way to wheat, and in the southern portion of it to maize also. The fourth zone, comprehending the southern peninsula, is that of the olive and evergreen woods. The orange flourishes in the southern portion of it, and rice is cultivated in a few spots in Italy and Spain.

Animals.—As regards animals the reindeer and polar bears are peculiar to the N. Bears and wolves still inhabit the forests and mountains; but, in general, cultivation and population have expelled wild animals.

Inhabitants.—Europe is occupied by several different peoples or races, in many parts now greatly intermingled. The Celts once possessed the W. of Europe from the Alps to the British Islands. But the Celtic nationalities were broken by the wave of Roman conquest, and the succeeding invasions of the Germanic tribes completed their political ruin. At the present day the Celtic language is spoken only in the Scotch Highlands (Gaelic), in some parts of Ireland (Irish), in Wales (Cymric), and in Brittany (Armorican). Next to the



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Celtic comes the Teutonic race, comprehending the Germanic and Scandinavian branches. The former includes the Germans, the Dutch, and the English. The Scandinavians are divided into Danes, Swedes, and Norwegians. To the E., in general, of the Teutonic race, though sometimes mixed with it, come the Slavonians, that is, the Russians, the Poles, the Czechs or Bohemians, the Servians, Croatians, etc. In the S. and S. E. of Europe are the Greek and Latin peoples, the latter comprising the Italians, French, Spanish, and Portuguese. All the above peoples are regarded as belonging to the Indo-European or Aryan stock. To the Mongolian stock belong the Turks, Finns, Lapps, and Magyars or Hungarians, all immigrants into Europe in comparatively recent times. The Basques at the western extremity of the Pyrenees are a people whose affinities have not yet been determined. The total population of Europe is about 425,000,000.

Political Divisions.—The lines of division of Europe were greatly changed and in many cases obliterated by the World War. As a result of the treaty following the conclusion of the war, new nations were established. This included Jugoslavia, Czecho-Slovakia, Poland, Latvia, Esthonia, Lithuania, and others. Germany lost, in addition to 5,600 square miles of territory, with nearly 2,000,000 inhabitants, by the recession to France of the provinces of Alsace and Lorraine, control of the great Saar Valley coal fields, to compensate in part for the coal mines of northern France destroyed or crippled during the war. Within 15 years from the coming into effect of the Peace Treaty, the inhabitants of this basin are to determine by plebiscite whether they shall remain under the control of the League of Nations, becoming a part of France, or revert to Germany. Germany was also compelled to surrender to Poland the vast area with a population of 6,000,000, and, in order to provide Poland with an outlet to the sea, Germany was compelled to relinquish the Baltic seaport of Danzig which became the free city of Danzig under the protection of the League of Nations. The Memel district, northeast of East Prussia, was given in charge of the Allied and Associated Powers, pending the final settlement of their sovereignty.

In addition to the Saar Basin, the Peace Treaty designated these areas for plebiscite to determine their eventual ownership. Two of these were in East Prussia, one in northern Schleswig, southern Schleswig, Holstein, and Upper Silesia. Plebiscites were held in all these prior to 1921, except Upper Silesia. Holstein and southern Schleswig elected to be reincorporated into the German Republic. North Schleswig voted to return to Denmark, and East Prussia preferred German as against Polish absorption.

By the Treaty of St. Germain, signed Sept. 10, 1919, the monarchy of Austria-Hungary ceased to exist. Its place was taken by the republics of Austria, Hungary, and Czecho-Slovakia, while large areas of its former territory passed into the hands of Italy, Rumania, and Jugoslavia. For further details see the articles on these countries. By the Treaty of Neuilly signed on Nov. 27, 1919, Bulgaria suffered a loss of territory. Bulgarian Thrace was given to Greece. To Jugoslavia was surrendered a strip of territory including the town of Strumitsa and two small portions of territory belonging to the western Bulgarian front. The total area of territory lost was about 2,000 square miles.

Turkey, by the Treaty of Sèvres, became in Europe scarcely more than a name. Its European territory included only a small tract of land west of Constantinople, and the city itself. The Dardanelles, the Bosporus, and the shores of the Sea of Marmora were placed under the control of the Interallied Commission. Turkish Thrace was awarded to Greece. Twelve islands formerly belonging to Turkey, known as the Sporades, were awarded to Italy, who, on the same day, ceded all the group with the exception of Rhodes, to Greece.

The Russian empire, as the result of the revolution, was deprived of a great area of territory from which new states were formed. These included the republics of Finland, the Baltic states of Esthonia, Latvia, and Lithuania, and a large territory which went to help form the republic of Poland. Montenegro ceased to exist as an independent power and became a part of the kingdom of Jugoslavia. Albania had declared its independence in 1917, but its boundaries had not been established at the beginning of 1921.

Italy gained, as a result of the war, the so-called "unredeemed provinces," including the Trentino region, Gorizia, and the Istrian peninsula, together with the great seaport of Trieste. The estimated area of this territory is between 15,000 and 18,000 square miles, with nearly 2,000,000 inhabitants. Italy also gained the administration of the island of Rhodes and several other small islands.

Greece made great territorial gains. In addition to the acquisition of Thrace

and many islands in the Ægean Sea, she also assumed administration of the Smyrna district in Asia Minor, with a proviso that a plebiscite at the end of five years shall determine whether or not it shall remain permanently in the hands of Greece.

Rumania profited greatly in territory. She was awarded the province of Bessarabia, formerly a part of Russia, the former Austrian crownland of Bukowina, together with Transylvania, a part of Banat, and other provinces from Hungary. By this acquisition Rumania became the largest country of the Balkan states, with an area equal to the combined areas of Czecho-Slovakia, Hungary, and Austria, with a population, in 1919, of 12,500,000.

Ukraine, formerly one of the richest provinces of Russia, declared itself an independent republic. Its boundaries are vague. It is claimed to have an area of about 200,000 square miles, with a population of 30,000,000. Its independence had not been acknowledged at the beginning of 1921.

History.—Europe was probably first peopled from Asia, but at what date we know not. The first authentic history begins in Greece at about 776 B. C. Greek civilization was at its most flourishing period about 430 B. C. After Greece came Rome, which, by the early part of the Christian era, had conquered Spain, Greece, Gaul, Helvetia, Germany between the Danube and the Alps, Illyria, Dacia, etc.

With the decline of the Roman empire a great change in the political constitution of Europe was produced by the universal migration of the northern nations. The Ostrogoths and Lombards settled in Italy, the Franks in France, the Visigoths in Spain, and the Anglo-Saxons in South Britain, reducing the inhabitants to subjection, or becoming incorporated with them. Under Charlemagne (771-814) a great Germanic empire was established, so extensive that the kingdoms of France, Germany, Italy, Burgundy, Lorraine, and Navarre were afterward formed out of it. About this time the northern and eastern nations of Europe began to exert an influence in the affairs of Europe. The Slavs, or Slavonians, founded kingdoms in Bohemia, Poland, Russia, and the N. of Germany; the Magyars appeared in Hungary, and the Normans agitated all Europe, founding kingdoms and principalities in England, France, Sicily, and the East. The Crusades and the growth of the Ottoman power are among the principal events which influenced Europe from the 12th to the 15th century.

The conquest of Constantinople by the Turks (1453), by driving the learned Greeks from this city, gave a new impulse to letters in western Europe, which was carried onward by the invention of printing, and the Reformation. The discovery of America was followed by the temporary preponderance of Spain in Europe, and next of France. Subsequently Prussia and Russia gradually increased in territory and strength. The French Revolution (1789) and the Napoleonic wars had a profound effect on Europe, the dissolution of the old German empire being one of the results. Since then the most important events in European history have been the establishment of the independence of Greece; the disappearance of Poland as a separate state; the unification of Italy under Victor Emmanuel; the Franco-German war, resulting in the consolidation of Germany into an empire under the leadership of Prussia; the partial dismemberment of the Turkish empire, including the loss of Crete; the loss by Spain of her colonies in 1898; the absorption by England of the Transvaal Republic and the Orange Free State in Africa in 1900. The political history of Europe from the beginning of the 20th century led directly to the World War. The seizure of Bosnia and Herzegovina by Austria in 1908, the Balkan Wars in 1912-1913, and the ever increasing militarism of Germany culminated in the great world struggle which began in August, 1914.

EURYALE, a genus of plants of the water-lily order, growing in India and China, where the floury seeds of some species are used as food.

EURYDICE (ū-rid'ī-sē), in Greek mythology, the wife of ORPHEUS (*q. v.*).

EUSEBIUS, a Greek writer, the father of ecclesiastical history; born in Palestine about A. D. 265. About 315 he was appointed Bishop of Cæsarea. He became an advocate of the Arians and condemned the doctrines of Athanasius. His ecclesiastical history extends from the birth of Christ to 324. Among his other extant work is a life of Constantine the Great. He died about 340.

EUSTACHIAN TUBE (ūs-tā'shun), in anatomy, a canal leading from the pharynx to the tympanum of the ear. See EAR.

EUSTATIUS, ST., a Dutch island in the West Indies, one of the Leeward Islands, 11 miles N. W. of St. Christopher's, pyramidal in form; area 8 square miles. Sugar, cotton, and maize are raised; but the principal production is tobacco. The climate is healthy, but

earthquakes are frequent. Pop. about 1,300.

EUTAW SPRINGS, a small tributary of the Santee river in Clarendon co., S. C. It is noted for the battle fought on its banks in 1781, between about 2,000 Americans under General Greene, and about 2,300 British under Colonel Stuart. The latter were defeated and driven from their camp but returned and Greene was compelled to retire. In the night, however, the British retreated toward Charleston, leaving 138 killed and wounded and about 500 prisoners. The Americans lost about 550 in killed, wounded and missing.

EUTERPE (-ter'pē), one of the Muses, considered as presiding over lyric poetry, the invention of the flute being ascribed to her. She is usually represented as a virgin crowned with flowers, having a flute in her hand. In botany, a genus of palms, natives of South America, sometimes nearly 100 feet in height.

EUTHANASIA, a term employed to describe painless methods of inducing death. The subject is chiefly of interest in respect to the close of illnesses in which the death agony is likely to be prolonged, and methods of easing pain in such cases by narcotics and similar means are regarded as admissible. The actual hastening of death in an apparently incurable illness is, however, a graver matter, and the weight of ethics, law and religion is strongly against such action, which is regarded as tantamount to actual slaying. The adage that while there is life there is hope expresses the fundamental principle opposed to euthanasia, and the cases are numerous of ultimate recovery on the part of a patient who has been doomed by expert opinion.

EUTROPIUS, FLAVIUS, a Latin historian, who flourished about A. D. 360. His abridgement of the history of Rome is written in a perspicuous style.

EVANGELICAL, a term often used to qualify certain theological views, especially strict views on the question of the atonement, justification by faith, the inspiration and authority of the Scriptures, and allied doctrines. In England the so-called Low Church party is evangelical in its views. In a more general sense the word implies a peculiar fervency and earnestness in insisting on such doctrines as regeneration, redemption, etc. The "Evangelical Church" is the official title of the Established Church of Prussia, formed in 1817 by the union of Lutherans and Calvinists.

EVANGELICAL ALLIANCE, an association of members of different sections of the Christian Church, organized in London in 1846, to lend its influence in favor of evangelical doctrines (see EVANGELICAL), religious union and liberty, and against superstition and unbelief. The alliance has branches throughout the world.

EVANGELICAL ASSOCIATION, a body of American Christians, chiefly of German descent, established about the beginning of the 19th century. In form of government and mode of worship it generally agrees with the Methodist Episcopal Church.

EVANGELICAL UNION, the name of a religious sect, also familiarly known as the Morisonians, from the Rev. James Morison, its originator. It took rise in Scotland in 1840, and three years afterward organized itself as a separate Christian denomination. The Morisonians maintain the universality of the atonement, combining with this the doctrine of eternal personal and unconditional election, and denying that anyone will be condemned for Adam's fall.

EVANGELIST, a writer of the history or doctrines, precepts, actions, life, and death of Christ; in particular, the "four evangelists," Matthew, Mark, Luke, and John.

EVANS, SIR ARTHUR JOHN, an English archæologist, born in Nash Mills, Herts, in 1851. He was educated at Oxford and in Germany. He spent 10 years in travel in eastern Europe, especially in the Balkans. From 1884 to 1908 he was keeper of the Ashmolean Museum at Oxford. In 1893 he undertook investigations in Crete, and these resulted in the discovery of remarkable archæological remains, which gave a new aspect to the history of prehistoric Europe. He wrote "Cretan Pictographs and Præ-Phoenician Script" (1896); "Scripta Minoa" (1909). He was knighted in 1911.

EVANS, AUGUSTA JANE (WILSON), an American novelist; born in Columbus, Ga., May 8, 1835. Her writings include: "Inez, a Tale of the Alamo" (1856); "Beulah," the most popular of her novels (1859); "St. Elmo" (1866); "At the Mercy of Tiberius" (1887); "A Speckled Bird" (1902); "Devota" (1907). She died in 1909.

EVANS, ROBLEY DUNGLISON, an American naval officer; born in Floyd co., Va.; was graduated at the United States Naval Academy in 1863; promoted ensign, Oct. 1, 1863; lieutenant, July 25, 1866; lieutenant-commander, March 12, 1868; commander, in July, 1878; captain, June 27, 1893; and rear-

admiral in 1901. During the Civil War he took part in the attack on Fort Fisher, Jan. 15, 1865, and in the land engagement was wounded four times. In 1891 he was in command of the "Yorktown" at Valparaiso, Chile, during the strained relations between the United States and that country. He commanded the "Iowa" in the action of July 3, 1898, off Santiago de Cuba, which resulted in the destruction of the Spanish fleet. He was promoted rear-admiral in 1901 and commanded the Asiatic fleet, 1902; flagship "Kentucky." He was in command of Atlantic fleet, 1905-1907; touring the world in the latter year. He retired Aug. 18, 1908. Publications: "A Sailor's Log" (1901); "An Admiral's Log" (1910). He died in 1912.

EVANS, SIR SAMUEL THOMAS, a Welsh lawyer. He was born in 1859 at Skewen, Neath, and was educated in the board schools. He studied law, was admitted to the bar, and entering politics, was elected to represent Glamorganshire (Mid. Div.) in 1890, continuing to sit in the House of Commons from that constituency till 1910. He became a King's Counsel in 1901, Recorder of Swansea 1906, Solicitor-General 1908, and a Privy Counsellor in 1910, becoming in this last year also President of the Probate, Divorce, and Admiralty Courts. He was a Justice of the Peace of Glamorganshire, Pembrokeshire and Beaconshire; Hon. Freeman of the County Borough of Swansea, and of the Borough of Neath. He died in 1918.

EVANS, THOMAS WILLIAMS, an American dentist; born in Philadelphia, Pa., Dec. 23, 1823; studied dentistry and practiced in Maryland and later in Lancaster, Pa.; made a specialty of saving teeth by filling. In seeking a substitute for gold foil he mixed rubber and sulphur, which make a black substance instead of a white one. Because of the unfavorable color he laid the substance aside and gave it no more thought, till his mixture was used by others for producing commercial gutta-percha, which he declared he had discovered. In 1848 he went by invitation to Paris as the most skillful American dentist, to attend to the teeth of President Louis Napoleon. During his career in Paris he accumulated a very large fortune. He also won an international reputation as an expert in military sanitation and was one of the founders of the Red Cross Society. His home was the refuge of the Empress Eugénie from the mob on the night of Sept. 4, 1870. Dressed in his wife's clothes, she was taken by him to the Normandy coast, where he secured her escape to England. He died in Paris, Nov. 14, 1896. Dr. Evans bequeathed all of his fortune, estimated at from $8,000,000 to $12,000,000, excepting $250,000, to establish a museum and institute in Philadelphia.

EVANSTON, a city in Cook co., Ill.; on Lake Michigan and on the Chicago and Northwestern and the Chicago, Milwaukee and St. Paul railroads; 12 miles N. of Chicago. It includes the villages of Rogers Park and South Evanston; is delightfully laid out; and has gas and electric light plants; electric and elevated railroads to Chicago; Holly system of waterworks, weekly newspapers, National bank. It is the seat of Northwestern University (M. E.) founded in 1851, largely endowed and of high repute, with a library and a museum. It is the seat also of the Garrett Biblical Institute, Winchell Academy, and of the Evanston College for Women, founded in 1871. The Dearbon Observatory was transferred here from Chicago in 1888, and dedicated the following year as a department of Northwestern University. Pop. (1910) 24,978; (1920) 37,215.

EVANSVILLE, a city port of entry, and the county-seat of Vanderburg co., Ind., on the Ohio river, and the Evansville and Terre Haute, the Louisville, Evansville and St. Louis, the Louisville and Nashville, and several other railroads: 185 miles W. of Louisville. It is on a high bank at a bend in the river midway between the falls and the junction with the Mississippi; is the trade center of a rich agricultural and coal region; and has the finest wharf and city front on the Ohio or Mississippi river. It has excellent shipping facilities, with 10 packet lines, iron and brass foundries, harness and saddlery, steam engine and boiler, furniture, boot and shoe, pottery, metal goods, tobacco, and chemical plants. The city contains the Evansville Insane, St. Mary's, and United States Marine Hospitals, County Infirmary, Evans Hall, United States Government Building, public day school for the deaf, a business college, public library, high school, daily and weekly newspapers, 3 National and several private banks, and an assessed property valuation of over $25,000,000. Pop. (1910) 69,647; (1920) 85,264.

EVAPORATION, the conversion of a liquid or solid by heat into vapor or steam, which becomes dissipated in the atmosphere in the manner of an elastic fluid. The process of evaporation is constantly going on at the surface of the earth, but principally at the surface of the sea, of lakes, rivers, and pools. The vapor thus formed, being specifically

lighter than atmospheric air, rises to considerable heights above the earth's surface; and afterward, by a partial condensation, forms clouds, and finally descends in rain.

EVARTS, WILLIAM MAXWELL, an American lawyer; born in Boston, Mass., Feb. 6, 1818; was graduated at Yale College in 1837 and studied at the Harvard Law School. In 1841 he began the practice of law in New York City; in 1849-1853 was assistant district attorney; and in 1868 was the principal counsel for President Johnson in his impeachment trial. In 1868-1869 he was Attorney-General of the United States; in 1877 principal counsel for the Republican party before the Electoral Commission on the Hayes-Tilden election returns; in 1877-1881 United States Secretary of State; and in 1885-1891 United States Senator from New York. He also represented the United States in the Alabama-claims case, and was the principal counsel for Henry Ward Beecher in his defense against the charges preferred by Theodore Tilton. He was famous as an orator. He died in New York, Feb. 2, 1901.

EVDOKION, ARCHBISHOP (MESCHERSKY), head of the Russian Orthodox Church in North America. He was born in the state of Vladimir, Russia, in 1869, and was educated in Moscow Theological Academy. In 1894 he became professor at the Theological Seminary of Novgorod, and in 1896 professor and inspector of the Moscow Theological Academy. In 1896 he became archimandrite, and in 1898 Master of Theology. He continued teaching in his professorial capacity for a number of years when in 1903 he was ordained bishop and appointed rector of the Moscow Theological Academy. He became bishop of Kashira, state of Tula, 1909, and in 1914 was named to his present position. He has written a book: "St. John the Divine."

EVE. See ADAM AND EVE.

EVELETH, a city of Minnesota, in St. Louis co. It is on the Duluth, Missabe, and Northern, and the Duluth and Iron Range railroads. It is the center of an important iron-mining region and has also industries of lumbering and dairying. There is a public library, parks, and other important public buildings. Pop. (1910) 7,036; (1920) 7,025.

EVELYN, JOHN, an English writer; born in Wotton, Surrey, Oct. 31, 1620. After completing his course at Oxford, he studied law at the Middle Temple. In 1659 he took the royal side in the civil war. He published works, including "Sculptura, or the History and Art of Chalcography"; "Sylva, or a Discourse of Forest Trees"; treatises on gardening, architecture, etc. But his most important work is his memoirs, which are interesting contributions to the history of the time. He died in Wotton, Feb. 27, 1706.

EVENING SCHOOLS, schools which endeavor to educate those who for various reasons cannot attend schools conducted in the daytime. For the most part they are attended by people who earn their livelihood by working through the day and who desire to better their positions. They provide instruction in the primary grades, in vocational training, and in the liberal arts. Those who desire the primary work are chiefly older children and adults who have grown up illiterate. The largest number of students attending evening schools in the United States are those who wish to place themselves above the position of unskilled laborers by learning a trade. The introduction of courses in liberal education is comparatively an innovation. In 1834 New York City established the first evening school and for a time it prospered, but as only primary instruction was given the number of students remained between ten and twenty thousand. When, however, evening high schools giving instruction in commercial and technical work were opened, the number of students greatly increased. The Cooper Union of New York, a private institution, is one of the most famous of those offering secondary and vocational education by evening high schools. Massachusetts now leads the States in the Union in the number of evening schools and in average attendance of students. Of the 204 cities which in 1913 had evening schools, 41 were located in Massachusetts cities. This has largely been the result of a law passed by the State in 1911, which made provision for the extension of the work in night schools as a part of the movement for vocational education. Many private institutions similar to the Cooper Union in New York have opened night schools. The Maryland Institute of Baltimore and the larger branches of the Young Men's Christian Association are conspicuous in the efforts to provide education for those who must earn their living by day labor.

In Germany the evening schools were started as early as the 18th century, but not until 1844 did they receive state or municipal aid. By 1914 Germany had established the most complete and effective system of evening schools, and attendance on them was made compulsory for certain classes of people. As a re-

sult nearly 600,000 Germans attended night school during 1914. The number attending in the United States did not exceed 150,000. England surpassed even this record in evening school attendance, nearly 700,000 being given instruction in 1914. The courses in England are more varied than elsewhere, and in most cases lead to degrees, a most unusual affair in the States. The municipal governments have made the evening schools centers of the social activities of the young people of the city, and much attention is paid to physical education.

EVENING STAR, the name given to any one of the planets that may be seen at certain seasons just above the horizon early in the evening; especially applied to the planet Venus on account of its brightness and beauty. Mars, Jupiter, and Saturn are the other evening stars.

EVEREST, MOUNT, the highest known mountain in the world, situated in the Himalayas, in Nepal. It is 29,140 feet high, and was named in honor of Sir George Everest, a noted English surveyor and civil engineer.

EVERETT, a city in Middlesex co., Mass., on the Boston and Maine railroad; three miles N. of Boston. It was part of Malden until 1870 and was incorporated as a city in 1893. It has electric railway connections with Boston and neighboring cities, and iron, steel, and woolen mills, and varnish and chemical works. It contains several public schools, high school, Whidden Hospital, Shute and Parlin Libraries, the Home School, weekly newspapers, savings banks, etc. Pop. (1910) 33,484; (1920) 40,120.

EVERETT, a city of Washington, the county-seat of Snohomish co. It is a port of entry and is at the mouth of the Snohomish river, on Puget Sound, and on the Great Northern, the Northern Pacific, and the Chicago, Milwaukee, and St. Paul railroads. It is also on several lines of freight and passenger steamboats. It is the center of an important lumbering, gardening, and mining community. There is an excellent harbor with facilities for docking vessels of large tonnage. The city has an important trade in lumber. Other industries include ship yards, paper and flour mills, iron works, and chemical works. It is the seat of the Pacific College and has a public library, hospitals, and the United States customs and assayer's offices. Pop. (1910) 24,814; (1920) 27,644.

EVERETT, CHARLES CARROLL, clergyman; born in Brunswick, Me., June 19, 1829; was graduated at Bowdoin College; and studied at the University of Berlin. He returned to Bowdoin College, where he was tutor for two years, librarian for five, and Professor of Modern Languages in 1855-1857. He was ordained pastor of the Independent Congregational Church in 1859; resigned in 1869 to become Professor of Theology in Harvard Divinity School; and was dean of the school from 1879 till his death. Among his published works are "The Science of Thought" (1869); "Religion Before Christianity" (1883); "Ethics for Young People" (1891); and "The Gospel of Paul" (1893). He died in Cambridge, Mass., Oct. 17, 1900.

EVERETT, EDWARD, an American statesman; born in Dorchester, Mass., April 11, 1794. After traveling for some years in Germany and England he returned to America in 1819 to occupy the chair of Greek Literature at Harvard. He became editor of the "North American Review," and entering the political world became successively member of Congress, governor of Massachusetts, and minister plenipotentiary to England (1840). In 1845 he was appointed president of Harvard College, and in 1852 Secretary of State. Shortly after he retired to private life. He died in Boston, Jan. 15, 1865.

EVERGLADES, a low marshy tract of country in southern Florida, inundated with water and interspersed with patches or portions covered with high grass and trees. In recent years extensive drainage systems were established and about 1,000,000 acres of land have been reclaimed (1920). Owing to the richness of the soil of this territory the land is eagerly sought for farming purposes and it is expected that in a few years the remaining 2,700,000 acres will be reclaimed for agriculture.

EVERGREEN, a plant that retains its verdure through all the seasons, as the fir, the holly, the laurel, the cedar, the cypress, the juniper, the holm-oak, and many others.

EVIDENCE, that which makes evident, which enables the mind to see truth. It may be intuitive, *i. e.*, resting on the direct testimony of consciousness, of perception or memory, or on fundamental principles of the human intellect; or it may be demonstrative, *i. e.*, in a strict sense, proofs which establish with certainty as in mathematical science certain conclusions; or it may be probable, under which class are ranked moral evidence, legal evidence, and generally every kind of evidence which, though it may be sufficient to satisfy the mind, is not an absolutely certain and incontrovertible demonstration.

In jurisprudence evidence is classified

into that which is direct and positive, and that which is presumptive and circumstantial. The former is that which is proved by some writing containing a positive statement of the facts and binding the party whom it affects; or that which is proved by some witness, who has, and avers himself to have, positive knowledge thereof by means of his senses. Whenever the fact is not so directly and positively established, but is deduced from other facts in evidence, it is presumptive and circumstantial only. The following are the leading rules regarding evidence in a court of law:

(1) The point in issue is to be proved by the party who asserts the affirmative. But where one person charges another with a culpable omission this rule will not apply, the person who makes the charge being bound to prove it. (2) The best evidence must be given of which the nature of the thing is capable. (3) Hearsay evidence of a fact is not admissible. The principal exceptions to this rule are: Death-bed declarations, evidence in questions of pedigree, public right, custom boundaries, declarations against interest, declarations which accompany the facts or are part of the *res gestæ* (things done), etc. (4) Insane persons and idiots are incompetent to be witnesses. But persons temporarily insane are in their lucid intervals received as witnesses. Children are admissible as witnesses as soon as they have a competent share of understanding and know and feel the nature of an oath and the obligation to speak the truth.

EVIDENCES OF CHRISTIANITY may be divided broadly into two great classes, viz., external evidences, or the body of historical testimonies to the Christian revelation; and internal evidences, or arguments drawn from the nature of Christianity itself as exhibited in its teachings and effects, in favor of its divine origin.

In the 16th and 17th centuries the influences of the Renaissance and the Reformation gave rise to a spirit of inquiry and criticism which developed English deism as represented by Herbert and Hobbes in the 17th century, and Collins and Bolingbroke in the 18th. The general position of English deism was the acceptance of the belief in the existence of God, and the profession of natural religion along with opposition to the mysteries and special claims of Christianity. It was in confutation of this position that the great English works on the evidences of Christianity of Butler, Berkeley, and Cudworth were written. In France the new spirit of inquiry was represented by Diderot, D'Holbach, and the encyclopædists, who assailed Christianity mainly on the ground that it was founded on imposture and superstition, and maintained by sacerdotal trickery and hypocrisy. No reply of any great value was produced in the French Church, though in the previous age Pascal in his "Thoughts" had brought together some of the profoundest considerations yet offered in favor of revealed religion. The 19th century was distinguished by the strongly rationalistic spirit of its criticism. The works of such writers as Strauss, Bauer and Feuerbach, attempting to eliminate the supernatural and mysterious in the origin of Christianity, were answered by the works of Neander, Ebrard, and Ullmann on the other side. The historical method of investigation, represented alike by the Hegelian school and the Positivists in philosophy, and by the Evolutionists in science, is the basis of the chief attacks of the present time against the supernatural character of Christianity, the tendency of all being to hold that, while Christianity is the highest and most perfect development to which the religious spirit has yet attained, it differs simply in degree of development from any other religion. Notable among later apologists of Christianity have been Paley (Natural Theology), Chalmers (Natural Theology), Mansel, Liddon, and others, lecturers of the Bampton Foundation; in Germany Luthardt, Ewald, Baumstark, and others.

EVOLUTION, the act of unrolling or unfolding. The word is used as a term in science and philosophy to indicate the development of an organism toward greater differentiation of organs and functions, and a more complex and higher state of being. Some regard HERBERT SPENCER (*q. v.*) as the author of the Doctrine of Evolution, others CHARLES DARWIN (*q. v.*)

In astronomy, the nebular hypothesis, which regards the planetary bodies as evolved from nebular or gaseous matter, is an example of evolution; in geology the old view, which considered the animal and vegetable life of each geological period as a new and separate organic creation, has given place to the evolutionary theory of a process of development from earlier types to those of the later periods. But the evolution of the more complex from the simple organisms probably never exhibits a linear series of advances. Evolution is a law, the operation of which is traceable throughout every department of nature; it is equally well illustrated from the history of philosophy or the arts, or from the historical development of society. Evolu-

tion has been most discussed (in connection with the evolutionary theory of the Origin of Species), as it affirms that all forms of life in both the animal and vegetable kingdoms have been developed by modifications of parts from one low form of life consisting of a minute cell. The steps by which this process has been accomplished, and the causes that have been mainly at work in it, form a department of research to which many notable scientists—Lamarck, St. Hilaire, Goethe, Schelling, Haeckel, Spencer, Darwin, Wallace, and others have contributed. John Fiske, in his doctrine of evolution, brings out vividly before us the ever-present God, destroying the conception of the world as a mere cosmic machine.

The origin of all mammals from one common parent form upward to man is an established fact. Man's evolution can be traced upward from a fish in 12 steps or stages. This fish ancestor of ours belonged to the order of the *Selachii*, the best existing species of which is the shark. In another direction this primitive fish gave rise to the higher forms of vertebrate amphibious animals leading up to man. The next higher class of vertebrates, leading toward man, are the batrachians or amphibians. The axolotl of Mexico, a fish-like animal with a long tail, belongs to this class. It has both gills and lungs, and can either respire water through the gills or air through the lungs. Similar are the numerous kinds of salamanders. An experiment was made of keeping the axolotl permanently out of the water. It lost its gills and became permanently mature and accustomed to its environment. Resembling these are the various kinds of toads and frogs, after which animals come the protamnians (lizard-like reptiles). These, losing their gills and breathing only through lungs, were a step farther removed from fishes. In the formation of the group of *Stegocephala*, from which man descended, a distinct advance occurs. A partition wall forms within the simple ventricle of the heart, dividing it into right and left ventricles. Progress is also noticed in the development of the brain, the skeleton, and the muscular system. The period at which the important advances occurred which laid the foundations for the mammal class, to which man belongs, was probably the Triassic. Out of that epoch came the monotremate mammal, of which the modern duck-bill or *Platypus* of Australia is a remnant. The next step higher in development was that of the marsupials, or animals whose females carry their young in pouches. From a branch of such pouched animals, the parent form of the higher or Placental mammals, of which man is an extremely specialized type, afterward sprang. Hence we reckon a whole series of pouched animals among the ancestors of the human race. The Placental mammals mark another distinct advance in evolution. To this group belong the carnivora, of which the lion, the tiger, the dog family and the bear family, are members. A special stage is that of the semi-apes, and probably our ancestor among the semi-apes resembled the existing lemurs, and like these, led a quiet life climbing trees. Immediately following are the true apes. Beyond a doubt, of all animals, the apes are the most nearly allied to man. A thousand million of years may have been consumed in this evolution of man.

EVORA, a city of Portugal, capital of the province of Alemtejo, 75 miles E. by S. of Lisbon. It is the center of a considerable steel, cotton, and woolen industry, but is most famous for its archæological museum, one of the best in the country. It contains a church library with 25,000 volumes. Pop. about 18,000.

EVREUX, a city of France, capital of the department of Eure, in Normandy, situated on the Iton, 67 miles W. N. W. from Paris. A considerable industry in linens, shoes, and gasoline engines is carried on, while the town is the center of an important grain trade. It was the center of heavy fighting during the World War, especially during the intensive operations incidental to the great Allied offensive, known as the Battle of Normandy.

EWALD, GEORG HEINRICH AUGUST VON (ā'valt), a German Orientalist and Biblical critic; born in Göttingen, Nov. 16, 1803. After studying at the university there, in 1827 he became extraordinary, in 1831 ordinary Professor of Theology, and in 1835 Professor of Oriental Languages. In 1837 he lost his chair at Göttingen on account of his protest against the king's abrogation of the liberal constitution, became Professor of Theology at Tübingen, but in 1848 returned to his old chair at Göttingen. When Hanover was annexed by Prussia in 1866 he became a zealous defender of the rights of the ex-king. Among his chief works are the following: "Complete Course of the Hebrew Language"; "The Poetical Books of the Old Testament"; "History of the People of Israel"; "Antiquities of the People of Israel." The history is considered his greatest work. He died in Göttingen, May 5, 1875.

EWELL, RICHARD STODDERT, military officer; born in Georgetown, D.

C., Feb. 8, 1817; was graduated at the United States Military Academy in 1840; served in the cavalry on the frontier, and during the Mexican War with Scott from Vera Cruz to the City of Mexico; and was promoted captain for gallantry and meritorious conduct at Contreras and Churubusco. At the outbreak of the Civil War he resigned his commission in the National army; joined the Confederates; and was actively engaged throughout the war. He took part in the Maryland campaign and in the battles of Bull Run, Gettysburg, and the Wilderness, and attained the rank of Lieutenant-General. After the war he retired to private life. He died in Springfield, Tenn., Jan. 25, 1872.

EWING, JULIANA HORATIA GATTY, an English story-writer and poet; born in Ecclesfield, Yorkshire, in 1841. Her stories for children became very popular and included "Daddy Darwin's Dovecote"; "Dandelion Clocks and Other Tales"; "A Flat-Iron for a Farthing"; "A Great Emergency and Other Tales"; and "Jackanapes." She died in Bath, England, May 13, 1885.

EWING, THOMAS, an American statesman; born near West Liberty, Va., Dec. 28, 1789; was graduated at the Ohio University in Athens in 1815; admitted to the bar in 1816; and practiced law for 15 years. He was a United States Senator from Ohio in 1831-1837 and 1850-1851; Secretary of the Treasury under President Harrison in 1841; and Secretary of the Interior under President Taylor in 1849. In the United States Supreme Court he ranked among the foremost lawyers of the nation. He died in Lancaster, O., Oct. 26, 1871.

EXCAVATOR, an apparatus used in making docks, railway cuttings, canals, etc. Excavators are made of two kinds, each adapted for different kinds of work, though in some cases they work together very effectively. In making a long "gullet" or cutting, the first to come into operation has the appearance and all the functions of the ordinary steam-crane, such as is used for loading railway trucks, with the exception that it is mounted on wheels to move on rails, and that, instead of the hook on the end of the chain, there is a large and strong plate-iron bucket or "scoop," with a very heavy handle or lever to which a second chain is fastened. The lever is heavy enough to counterbalance the scoop when filled with clay. The machine begins by lowering the scoop, and the two chains are made to push it into the bank until it is full. The suspension chain then lifts the scoop over the wagon, while the chain on the handle lifting it up empties it. The machine now swings round on its center to renew the operation. The largest size can excavate two cubic yards per minute. As the excavator advances over its rails, those behind are brought to the front. The cutting is made as wide as the arm or "jib" will reach on both sides of it, which leaves sufficient room for the men to work round it freely, and for wagons to pass.

When the cutting has been made the requisite distance forward, the second class of excavator is brought forward to make the cutting wider. The original conception of this is clearly derived from the dredging machine, which has long been in use in deepening harbors and the mouths of rivers. Its sides are made sloping to an angle of 45°, and on the top of the bank a temporary line of rails is laid a few feet from the edge. The machine is placed on the rails at the end of the cutting; the jib is lowered until the row of buckets it carries can cut into the clay; these scrape up the bank, reaching the top of it full of soil; they next pass over the machine, and are emptied into the wagons beyond it. The excavator and wagons move forward simultaneously, the latter receiving, in the case of some excavators, a continuous stream of clay equal to about four cubic yards or two wagon loads per minute.

All the movements of excavators are effected by the power of the engine, and two men manage each machine.

EXCHANGE, the act of exchanging, or giving one thing for another; or that which is so given. In commerce, a place where merchants, brokers, etc., meet to transact business; generally contracted into 'Change. The institution of exchanges dates from the 16th century. They originated in the important trading cities of Italy, Germany, and the Netherlands, from which last-named country they were introduced into England. In some exchanges only a special class of business is transacted. Thus there are stock exchanges, corn exchanges, coal exchanges, cotton exchanges, etc. For bill of exchange, see BILL.

Course of exchange, the current price of a bill of exchange at any one place as compared with what it is at another. If for $500 at one place exactly $500 at the other must be paid, then the course of exchange between the two places is at par; if more must be paid at the second place, then it is above par at the other; if less, it is below it. Arbitration of exchange, the operation of converting the currency of any country into that of a second one by means of

other currencies intervening between the two. In arithmetic, a rule for ascertaining how much of the money of one country is equivalent in value to a given amount of that of another. In law, a mutual grant of equal interests, in consideration the one for the other.

Theory of exchange, a hypothesis with regard to radiant heat, devised by Prevost of Geneva, and since generally accepted. All bodies radiate heat. If two of different temperatures be placed near each other, each will radiate heat to the other, but the one higher in temperature will receive less than it emits. Finally, both will be of the same temperature, each receiving from the other precisely as much heat as it sends it in return. This scale is called the mobile equilibrium of temperature.

EXCHEQUER, in Great Britain, the department which deals with the moneys received and paid on behalf of the public services of the country. The public revenues are paid into the Bank of England (or of Ireland) to account of the exchequer, and these receipts as well as the necessary payments for the public service are under the supervision of an important official called the controller and auditor-general, the payments being granted by him on receipt of the proper orders proceeding through the treasury. The public accounts are also audited in his department.

EXCOMMUNICATION, a word denoting exclusion, whether temporary or permanent, from fellowship in religious rites, involving also, where participation in such rites is required in the civil order, privation of the rights of citizenship. It is not peculiar to the Biblical religions, but is found in most of the sytematized cults, whatever their origin. The clearest analogy, however, to the Christian discipline of excommunication is that furnished by the Rabbinical code. The offender first received a public admonition, and seven days later, if he did not make satisfaction, the lesser excommunication, Niddui, was pronounced against him, whereby he was isolated during 30 days from contact with all save his wife and children, being obliged to keep at least four cubits' distance from all others; and though the sentence did not technically include expulsion from the synagogue, yet this provision practically enforced it. At the expiration of 30 days, a second term of like duration was enjoined in case of continued impenitence; and the contumacious were then visited with the greater excommunication of Cherem, which excluded both from the synagogue and from all social intercourse, and the offender was treated as a leper. These two grades of excommunication were the only ones anciently in use; but the later rabbins added a third and severer one, styled Shammatha or Anathema Maranatha, which was lifelong, attended with solemn imprecations, and sometimes entailing forfeiture of goods.

The Christian system of excommunication is based doctrinally on the precept of Christ (Matt. xviii: 15-18) and on the precepts and practice of St. Paul. It was primarily, as the word denotes, exclusion from communion in the eucharist and the agape, or love-feast, including also suspension from office in the case of clerical offenders; and it was distinguished as major and minor, each having various degrees of severity.

The most notable exercise of the power of excommunication in the modern Anglican Church was when Bishop Gray, as Metropolitan of Cape Town, deprived and excommunicated Bishop Colenso of Natal in 1863, which sentence, approved by the Convocations of Canterbury and York, the General Convention of the American Episcopal Church, the Episcopal Synod of Scotland, and the Provincial Council of Canada, was reversed by the Judicial Committee of Privy-Council in 1865.

In the Established and other Presbyterian Churches of Scotland, the lesser excommunication, involving deprivation of all "sealing ordinances," can be pronounced by the kirk session.

Islam forms an exception to the almost universal incidence of the practice of excommunication. Under the Moslem code every religious offense carries with it a temporal penalty, such as fines, scourging, stoning, or other mode of death, and only in this last manner can an offender be cut off from the congregation.

EXCRETION, the process in animal and plant physiology which separates from the essential substance or animal body waste matter of no further use in nutrition. The organs so employed partake of the characters of strainers, which retain substances soluble in the blood necessary to health and extrude the harmful. The primary excretory organs in vertebrates are the kidneys. The function of these is to separate from the blood the waste materials produced by the decomposition of nitrogenous substances and expel them from the body. The lungs and the skin likewise perform some of the duties of excretory organs. In its simplest form the excretory organ is found in the Protozoa, in which the contractile vacuole by means

of delicate infusoria drains the waste material and then discharges the contents.

EXECUTION, the carrying out of a death sentence by court order. Such cruel methods, as burning at the stake, starving, drowning, poisoning, bleeding to death, breaking on the wheel, etc., are no longer employed as modes of punishment in the progessive countries. In Belgium, Holland, Norway, Portugal Rumania, Finland, Argentine, Brazil, Venezuela, Guatemala, and Ecuador life imprisonment is the heaviest punishment inflicted and no person is ever put to death. In England and Spain, hanging is the common form of execution. In France, a death sentence is usually carried out by the use of the guillotine for decapitation. In Italy the death penalty is not inflicted in any case. In modern times the tendency has been toward the employment of the least cruel methods of execution.

Capital punishment is retained in 36 States of our Union. The usual method of execution is either by hanging or electrocution. The Federal Government may punish high treason by death penalty. In most States death penalty is inflicted only for murder, in some others also for arson and rape. Arizona, Kansas, Maine, Michigan, Minnesota, Mississippi, North Dakota, South Dakota, Oregon, Rhode Island, Washington, and Wisconsin do not inflict any death penalty.

EXECUTION, MILITARY, a technical term, signifying the carrying out of the decision of any military court, not necessarily a death sentence. Military laws and their execution, or administration, are quite separate and distinct from the civil laws of the same territory, the former having as their special object the maintenance of military organization and discipline. The offenses covered are, therefore, of a peculiar nature, such as desertion, absence without leave, disobedience, or refusal to obey orders, neglect of duty, and, among officers, "conduct unbecoming that of a gentleman." Those subject to the jurisdiction of military law are, first of all, officers and soldiers on the active list, in the pay of the Government, whether of the regular army or the militia; retired officers and soldiers; discharged officers or soldiers who have defrauded the Government; and general prisoners. In time of war certain civilians may be included, such as those suspected of being spies in the pay of the enemy, and camp followers. Punishments range from imprisonment, dishonorable dismissal or discharge, to death. Before the decree of a military court may be executed it must first be what is termed confirmed. In the British army this confirmation is done by a special officer representing the King, but in the United States army the highest commanding officer of the department is competent to confirm a sentence in ordinary cases. Where a court sentences an officer to dismissal from the service, however, the confirmation must be signed by the President of the United States himself, and this rule applies also to death sentences, except in very special cases.

EXECUTIVE DEPARTMENT, that branch of government whose duty it is to enforce or execute the law. According to the accepted canon of political science, there are three departments of government: the legislative or law-making body, the judicial branch, which interprets the law, and the executive. In the Federal Government of the United States the President is the chief executive, assisted by the various heads of departments. In the State governments the governor heads the executive department. The heads of the executive departments, that is, the secretaries of State, War, Navy, Treasury, Interior, Commerce, Agriculture, and Labor, with the Attorney-General and Postmaster-General, constitute the President's advisers or Cabinet. This was not provided for in the Constitution, which vests the entire executive power in the President's hands, but the Cabinet has grown up as a matter of necessity.

EXETER, a city, river-port, and parliamentary and municipal borough of England, in the county of Devon, on the left bank of the Exe, 10 miles N. W. from its outlet in the English Channel. It is pleasantly situated on the summit and slopes of an acclivity rising from the river, and has handsome squares, terraces, and streets. Among the objects of interest are the cathedral (founded 1112), the remains of the castle of Rougemont, the Guildhall, the Albert Memorial Museum, St. Michael's Church, etc. Exeter has iron foundries, manufactories of agricultural implements, paper mills, etc., and Honiton lace is also made. By means of a canal vessels of 300 tons can reach the city. The largest vessels remain at Exmouth. Exeter is a place of remote antiquity, having been a British settlement long prior to the invasion of the Romans. Pop. about 50,000.

EXETER COLLEGE, one of the colleges at Oxford University, England. Founded by Stapeldon, Bishop of Exeter, in 1314. It consists of a rector, 12 fellowships, and more than twenty scholarships. Eight of the latter, in accordance with the will of the founder, are reserved for those born or educated in the diocese of Exeter. The buildings have been ex-

tensively restored, most of them dating from the 17th and 18th centuries. The chapel was built in 1857-1858 by Sir Gilbert Scott. A beautiful secluded garden adds to the attractiveness of the buildings.

EXFOLIATION, in surgery, the process by which a thin layer or scale of dead bone separates from the sound part.

EXHIBITION, a benefaction settled for the maintenance of undergraduates in the universities of England, the British colonies, and America. In Scotland such scholarships are called bursaries.

EXHIBITIONS, INDUSTRIAL. Modern industrial exhibitions differ from the festivals and fairs of ancient times, of which they are a development, chiefly in the fact that they do not aim at immediate and retail sales, but rather for the purpose of showing the progress of industry and of general advertisement. The fair in its manifold aspects of athletic spectacle, and commercial and artistic concourse, is almost as old as civilization itself. The Olympic festivals in Greece brought together merchants who exhibited their wares. The great fair of Tailtenn in Ireland was likewise an athletic and commercial festival, the oldest known in northern Europe. Fairs of this multiple character were known in Egypt and Persia, and seem to have arisen on occasions that brought large numbers of people together, permitting merchants to make exhibition of their wares. Following the usual pathway of civilization, they passed from Greece to Italy and the other countries of Europe, and Charlemagne appears to have favored the establishment of such a fair in the 9th century in his capital of Aix-la-Chapelle. The most considerable of these fairs in Europe are those of Leipzig in Germany and Nizhni Novgorod in Russia, both of them of respectable antiquity. On a smaller scale similar gatherings have long existed in other countries, but the great expansion of modern industry has resulted in an immense development of the idea, and the industrial exhibition, as it is conceived of to-day, greatly differs from its predecessors in its duration, magnitude, and setting. These exhibitions now often partake of a national character and are held in the capital or a chief city of the country. Napoleon inaugurated an exhibition in Paris in 1802 which won so much success that similar exhibitions came to be held every three years. Similar exhibitions began to be held in Dublin under the auspices of the Royal Dublin Society, beginning with 1829. The idea had an early vogue in the United States and the American Institute of New York, founded in 1828, initiated a series of industrial exhibitions. The St. Louis Exposition, which was first opened in 1883, was modeled on the expositions which had by that date attained a great vogue in France. Side by side with the utilitarian aspect an artistic setting was aimed at and the arts as well as commerce and industry were sought to be represented. These exhibitions then came to be a feature in the commemoration of important events or to serve as a close to some large undertaking finally accomplished. Thus the World's Industrial Cotton Culturist Exposition, held in New Orlaens, La., 1883-1884, was followed by the California Mid-Winter Exposition, held in San Francisco in 1894. Following these were the Cotton States and Industrial Exposition, held in Atlanta, Ga., 1895; the Tennessee Centennial Exposition, held in Nashville, Tenn., 1897; the Trans-Mississippi Exposition, held in Omaha, Neb., 1898; the Pan-American Exposition, held in Buffalo, N. Y., in 1901; the South Carolina Interstate and West Indies Exposition, held in Charleston, S. C., in 1902; the Lewis and Clark Centennial American Pacific Exposition and Oriental Fair, held in Portland, Ore., 1905; the Jamestown Tercentennial Exposition, held in Hampton Roads, Va., 1907; and the Alaska-Yukon Pacific Exposition, held in Seattle, Wash., in 1909. The first exhibitions that partook on their scale the character of the great international expositions of recent years were the Society of Arts exhibition, held in London in 1851, and the Paris International Exposition of 1855. The London exhibition was visited by 6,039,195 people; there were 13,938 exhibitors; and the receipts amounted to $2,444,718, as against $1,600,000 expenditure. The Paris Exposition was a much more elaborate affair. It was held in the Champs Elysées in a vast Palais de l'Industrie, 827 feet long by 354 feet wide, designed and solidly built as a home for similar future exhibitions. Round this permanent building were grouped other halls devoted to separate arts and industries. It was the greatest and most artistic exposition held up to that date in any country, and almost 5,000,000 people visited it, while the expenditure amounted to something like $5,000,000. The next great international exhibition held in London in 1862 left as a permanent memorial the great iron and glass building known as the Crystal Palace. The exhibitors numbered 28,653; the visitors 6,211,103; and the expenditure amounted to roughly $5,000,000. All

these exhibitions were again surpassed by that held in the Champs de Mars, Paris, in 1867. The site in this case occupied 171 acres, in the center of which was erected a central palace, rectangular with circular ends, 1,608 feet in length and 1,247 feet in width, with a great central dome, and provided with gardens and galleries. Concentric galleries housed the industries of the various countries, with avenues radiating from the central garden. Grouped round the central palace were nearly a hundred structures devoted to industries and arts. The exhibitors numbered 50,226; the expenditure totaled $5,883,400; the receipts approached $3,000,000 exclusive of subsidies made by the city and the nation. Nearly 10,000,000 people visited the Exposition, and these included visitors from every country on earth. During the early part of the second half of the 19th century industrial exhibitions, having an international character, became the rule and these were held in many cities of Europe and America and other countries, including Constantinople, Dublin, Oporto, Havre, Amsterdam, Stockholm, Melbourne, Sydney, Moscow, and St. Louis. Under the auspices of the Austrian government an important international exposition was held in Vienna in 1873, the visitors to which numbered 7,254,687. The first Centennial anniversary of the Declaration of Independence was commemorated by the International Centennial Exhibition in Philadelphia in 1876. The fourth centennial anniversary of the discovery of America was signalized by the World's Fair in Chicago in 1893, and this was followed by the California Mid-Winter Exhibition held in 1894 at San Francisco. The Paris Exposition of 1900 touched the high-water mark. The site took in an area of 336 acres in the heart of Paris on both banks of the Seine. The erection of the various buildings cost $27,000,000, and several of them were of a permanent character and of great beauty. The exhibition lasted from April 14 to Nov. 11, and was visited by over 50,000,000 people, of whom in one day, Sept. 6, 600,528 are estimated to have passed through the gates. There were 79,712 exhibitors, 31,946 of them French. Edifices were erected by various nations, and the whole represented a wonderful assemblage of the products of the various industries and arts throughout the world. In 1915 an international exhibition was held in San Francisco, Cal., to celebrate the opening of the Panama Canal. On the day the exhibition was opened its cost is said to have totaled over $50,000,000. The exhibition covered a site of 635 acres, and the construction took nearly four years, beginning in October, 1911. There were eight large central palaces, while avenues and courts divided buildings of lesser dimensions from each other. Thirty-six foreign nations took part and some of them erected pavilions. The international industrial exhibition has thus come to play a great part in the life and business of the modern world, and is showing itself capable of continual development, so that wonderful as these exhibitions have been in the past, it is evident that they are going to assume still more striking forms in the future.

EXMOUTH, a seaport and market-town of Devonshire, England. It is an attractive summer resort and has a good beach and handsome promenades. Its elevation is high and it is noted for its mild climate. The chief industries are lace-making and fishing. Pop. about 15,000.

EXMOUTH, EDWARD PELLEW, VISCOUNT, a British naval officer; born in 1757. He went to sea at the age of 13, served as midshipman in the "Blonde" frigate during the American war, and greatly distinguished himself at Lake Champlain. In 1782 he was made a post-captain for a brilliant action in the "Pelican," and on the outbreak of the war of 1793 was appointed to the command of the frigate "La Nymphe." From this time till the peace in 1802 he was employed in active service. In 1804, on the resumption of hostilities, he commanded the East India station, in the "Culloden," till 1809, when he had attained the rank of vice-admiral. In 1814 he was made Baron Exmouth with a pension of £2,000 per annum. In 1816 he proceeded to Algiers in command of the combined fleet of 25 English and Dutch ships to enforce the terms of a treaty regarding the abolition of Christian slavery which the dey had violated. He bombarded the city and inflicted such immense damage that the dey consented to every demand. Three thousand Christian slaves were by this exploit restored to liberty. Lord Exmouth was raised to the dignity of a viscount for this service. In 1821 he retired to private life, and he died Jan. 23, 1833.

EXODUS, the name given in the Septuagint to the second book of the Pentateuch, because it describes the departure of the Israelites from Egypt. The contents of the book are partly historical, describing the departure of the Israelites from Egypt, and partly legislative, describing the promulgation of the Sinaitic law.

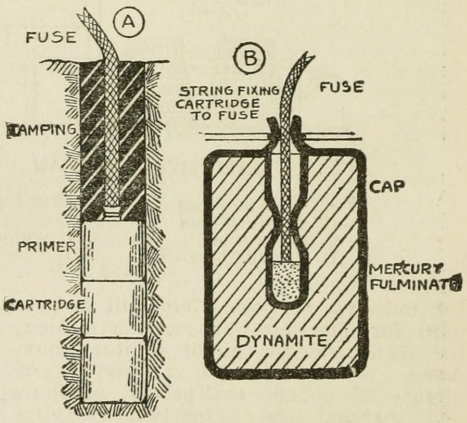
EXOPHTHALMIC GOITER, enlargement with turgescence of the thyroid gland, accompanied by protrusion of the eyeballs, breathlessness, palpitation, and anæmia. Also called Basedow's or Graves' disease.

EXPANSION, in physics, is the enlargement or increase in the bulk of bodies, in consequence of a change in their temperature. This is one of the most general effects of heat, being common to all bodies whatever, whether solid or fluid. The expansion of fluids varies considerably, but, in general, the denser the fluid, the less the expansion; and, commonly, the greater the heat, the greater the expansion; but this is not universal, for there are cases in which expansion is produced, not by an increase, but by a diminution of temperature. Water, in cooling, ceases to contract at 42° F.; and at about 39°, just before it reaches the freezing point (32°), it begins to expand again, and more and more rapidly as the freezing point is reached. This expansion is about one-eleventh of its bulk, and accounts for the bursting of pipes, etc., when water is freezing in them.

EXPATRIATION, the act or state of banishment from one's native country; also the voluntary renunciation of the rights and liabilities of citizenship in one country to become the citizen or subject of another. In the early part of the 19th century, the United States was almost the only nation that claimed for individuals the right of expatriation without the consent of the government of which they were citizens or subjects. The European nations, as a rule, maintained that the permission of the sovereign was necessary; and the enforcement by England of this claim was one of the causes of the War of 1812. It must be said, however, that notwithstanding the position of the United States in regard to citizens or subjects of foreign powers, the right of voluntary renunciation of allegiance to the United States by one of our citizens was unsettled, so far as legislation was concerned, till the act of Congress of July 27, 1868, asserted that expatriation "is a natural and inherent right of all people," but the action of the Department of State had previously seemed practically to admit the right. As far as foreign States are concerned, however, the United States has steadily maintained its original position. The first formal recognition of its claims was secured in an expatriation treaty with the North German Confederation, signed Feb. 22, 1868. England first recognized the right of voluntary expatriation by act of Parliament in 1870, and immediately concluded an expatriation treaty with the United States. All the leading nations of Europe now recognize the right, including besides those just mentioned, France, Austria, Russia, Italy, and Spain.

EXPECTORANTS, in pharmacy, medicines which favor the discharge of mucus from the windpipe and air-passages of the lungs.

EXPLOSIVES are substances which, by sudden decomposition or chemical action, produce large volumes of heated gas. The decomposition can be brought about by heat, by a blow or by other means. All explosives in actual use are those in which the chemical action is one of oxidation, the oxygen being supplied either by a nitrate or chlorate, nitric acid or an NO_2 group. The ease with which an explosion can be brought about depends very largely on the physical condition of the explosive. For instance, gunpowder varies widely in its effects, according to the size of the particles composing the mixture. While the force of all explosives is increased by inclosing them in a small space, confinement is not necessary in the case of those compounds in which decomposition is very rapid, as, for instance, mercury fulminate.



EXPLOSIVES
A. Blasting charge
B. Cross section of primer

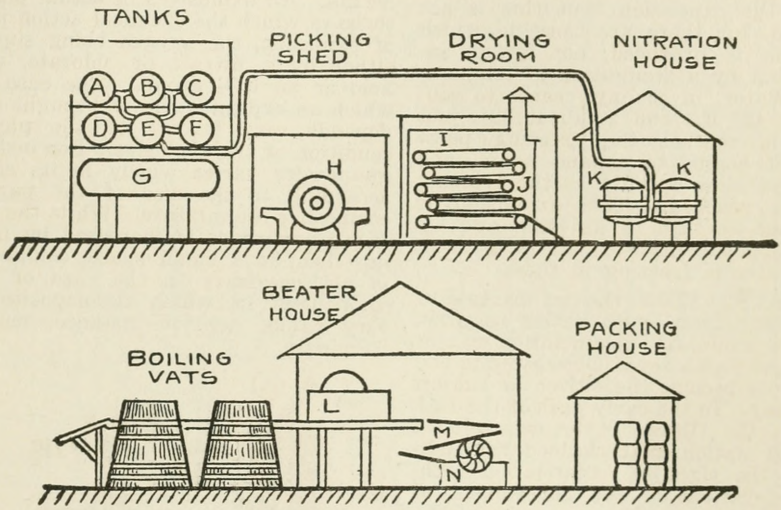
In an article of this length it would be impossible to deal, even briefly, with all substances of an explosive nature, but as far as possible, representative types of all the well-known groups will be described.

1. *Explosive mixtures*, as distinct from explosive compounds, consist of two or more substances, at least one of which is a combustible, and at least one

of which is a supporter of combustion. The ingredients of these mixtures are frequently not themselves explosives, but may be ordinary combustibles such as carbon, or sulphur, and stable salts such as chlorate or nitrate of potash. In the explosive powder, however, these otherwise harmless substances are incorporated so thoroughly, and are in such a fine state of division, that combustion can be induced almost instantaneously throughout the mass, with a consequent rapid evolution of hot gases, thus producing the phenomenon known as an explosion. The best known member of this class is *gunpowder*, now almost obsolete for military purposes, but still largely used for sporting purposes, in mining, for fuses and for minor military purposes. It consists of a mixture of nitrate of potash (saltpeter), sulphur, and charcoal, the proportions varying somewhat, but being approximately fifteen parts of potassium nitrate to two parts of sulphur and three parts of charcoal. Great care is taken in selecting the sulphur, while the charcoal is prepared in special retorts, and the process of manufacture is one requiring much skilled supervision. Many modifications of gunpowder have been made from time to time. In place of charcoal, such materials as coal, coke, peat, sawdust, bran, sugar, starch and many others have been used, while powders have been produced containing either no sulphur at all or only a very small percentage. As substitutes for saltpeter, nitrates of sodium, barium, and ammonia have been employed, the latter extensively in the manufacture of "safety explosives" for use in mines.

Ammonal consists of a mixture of ammonium nitrate, aluminum and charcoal. Mixtures containing chlorates and perchlorates in place of nitrates have been manufactured and used to a considerable extent, but, owing to their unstable character, have never very largely replaced the nitrate mixtures.

2. *Explosive compounds* are those substances which are of such a nature as to be themselves explosive. Instead of a chemical reaction taking place between two separate substances, the reaction occurs within the molecule of a single substance. As a consequence explosive compounds are more powerful in their action than mixtures, and modern explosives used in warfare all belong to this class. For the most part they are produced by the nitration of organic compounds and the best known and most widely used is *trinitrotoluene*, commonly called T.N.T. This is manufactured by the nitration of toluene in successive stages, mononitrotoluene being first produced, then dinitrotoluene, and finally, trinitrotoluene. It occurs as yellow crystals, which darken on exposure to light, but is frequently used as a fused mass. When held in a flame, it does not explode,



EXPLOSIVES—DIAGRAM OF GUN-COTTON FACTORY

Key:

A. Sulphuric acid
B. Sulphuric acid
C. Nitric acid
D. Strong waste acid
E. Mixed acids
F. Oleum
G. Water
H. Teasing machine
I. Endless belts
J. Steam trays
K. Nitration pans
L. Beater
M. Sand trays
N. Poacher

but burns with a smoky flame. It can, however, be detonated by means of fulminate of mercury. It is safe to handle and remarkably stable, and while slightly less powerful than picric acid it has the advantage that it does not attack metals or form unstable compounds with them.

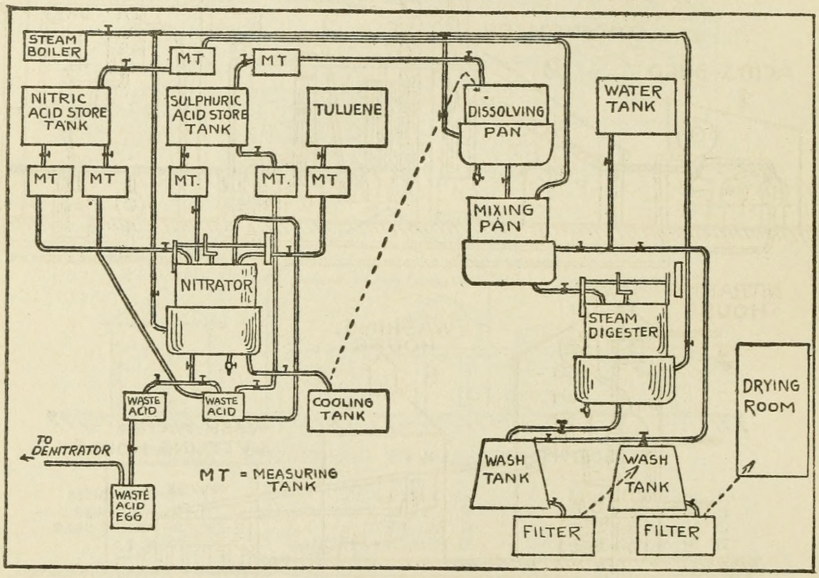
Picric acid, or trinitrophenol, occurs as bright yellow crystals, but is usually fused when used as an explosive (*v.* LYDDITE). Picric acid does not explode easily by direct percussion, but it can be readily detonated by mercury fulminate.

Nitroglycerin is prepared by nitrating glycerine in the presence of sulphuric acid. It is a heavy, oily liquid, having a specific gravity of 1.60. Owing to the great danger of premature explosion during transportation, nitroglycerin is no longer used as such. It forms, however, an important constituent of *dynamite*, which consists of nitroglycerin, absorbed on a base, which may be inert, combustible or explosive. The absorbents chiefly used are kieselguhr, magnesia, charcoal, and wood pulp. Explosive bases are usually nitrates of potassium, sodium, or ammonium or organic nitro derivatives.

Guncotton, or trinitrocellulose, is manufactured by nitrating cotton with a mixture of nitric and sulphuric acids. It is a grayish-white solid, odorless and tasteless, and, when properly prepared, is a safe and permanent explosive.

Smokeless powders are mixtures of nitrocellulose or nitrocellulose nitroglycerin, with other ingredients added as stabilizers, "deadeners," or "coolers." The explosive is dissolved (usually in acetone or a mixture of ether and alcohol), the mixture is rolled into sheets, the solvent evaporated, and the powders finally dried at a temperature of about 40° C. *Cordite* belongs to this class, and consists of a mixture of nitroglycerin and guncotton, with a small amount of vaseline, gelatinized by means of acetone, and dried.

Percussion caps are filled with explosive compositions, of which the chief constituent is mercury fulminate ($Hg(CNO)_2$). When used alone, however, this substance is too rapid in its action and it is, therefore, mixed with such materials as potassium chlorate, sulphur, antimony sulphide, and powdered glass.



EXPLOSIVES—DIAGRAM OF MANUFACTURE OF TRINITROTOLUENE (T.N.T.)

Other explosive compounds have been prepared by nitrating starch, sugar, dextrin, gelatin, resin, and even coal, but these are of minor importance.

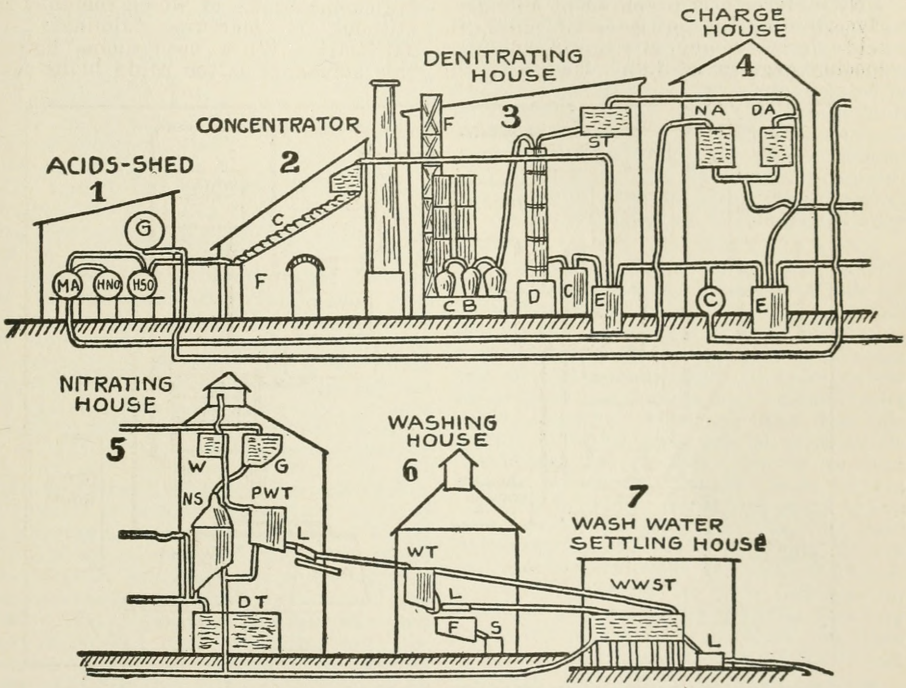
EXPRESS, in the United States, a system organized for the speedy transmission of parcels or merchandise of any kind, and their safe delivery in good condition. It originated in the trip made from Boston to New York by William Frederick Harnden (1813-1845), the first "express-package carrier," March 4, 1839. The project recommending itself to busi-

ness men, competing companies sprang up rapidly, and express lines were established in all directions. Adams & Co.'s California express was started in 1849; Wells, Fargo & Co.'s in 1852; the American-European Co. was created in 1855. As railways extended, the early "pony express" disappeared, and individual companies now have contracts with the several railway companies, their business over these routes being held to be entitled to protection of the courts against any efforts to dispossess them. Express companies developed greatly in the 19th and 20th centuries. From 1918 to 1920 the companies in the United States, in common with the railroads, were under Government control. They were restored to the parent companies on March 1, 1920. Express companies issue various forms of money orders for both foreign and domestic use.

EXPRESSED OILS, in chemistry, those oils which are obtainable from bodies only by pressing, to distinguish them from mineral and essential oils, which last are, for the most part, obtained by distillation.

EXTENSION, UNIVERSITY. See UNIVERSITY EXTENSION.

EXTERRITORIALITY, a term used in international law for those privileges granted to foreigners by states exempting them from being subject to the laws of that state while they are within its boundaries. There are three recognized cases in international law: (1) The persons and property of ambassadors or ministers and their suite. In certain non-Christian nations this has been extended to include consuls. (2) The persons and property of visiting sovereigns. (3) Public ships in foreign waters. The privilege of being exempt from the laws of non-Christian states has been obtained by the Western powers for all of their subjects residing in such countries as Turkey, China, etc. These provisions guaranteeing exterritoriality to Chris-



EXPLOSIVES—DIAGRAM OF NITRO-GLYCERINE FACTORY

Key:

1. G, glycerine store; MA, mixed acid store; HNO_3, nitric acid; H_2SO_4, sulphuric acid.
2. C, cascade; F, furnace.
3. F, fume shaft; CB, collecting bottles; D, denitrator; C, cooler; E, acid egg; ST, settling tank.
4. NA, nitrating acids; DA, displacing acids; C, compressor; E, acid egg.
5. W, water tank; G, glycerine tank; NS, nitrator separator; PWT, pre-wash tank; L, labyrinth; DT, drowning tank.
6. WT, washing tank; L, labyrinth; F, filter; S, scales.
7. WWST, wash water settling tank; L, labyrinth.

tian subjects of foreign nations were incorporated in the case of Turkey and the nations of the Far East into definite treaties. Likewise the privileges and immunities granted by the Italian government to the Pope come under cases of exterritoriality. In the "Alabama" case the arbitrators at Geneva ruled that the immunity granted to vessels of a foreign nation could not be called a right which belonged to them, but only a courtesy and hence did not relieve the neutral state in whose harbor they were from the responsibility of preserving that neutrality.

EXTRACT, a term to denote all that can be dissolved out of a substance by a specified menstruum, such as water, alcohol, ether, etc. Extracts must be capable of being redissolved, so as to form a solution like that from which they were derived. Extracts are used in cookery, medicine, and the manufacture of perfumery. Extract of meat is a soft, yellowish-brown, solid, or very thick syrup, which is employed as a portable soup.

EXTRADITION, the act by which a person accused of a crime is given up by the government in whose territories he has taken refuge to the government of which he is a subject. Conventions have been entered into by Great Britain with almost all civilized countries for the apprehension and extradition of persons charged with particular offenses, especially those of the most heineous stamp, such as murder, robbery, embezzlement, arson, rape, piracy, obtaining money under false pretenses, unlawful destruction and obstruction of railroads, procuring abortion, etc. The Extradition Act of 1870 makes special provision that no criminal shall be surrendered for a political offense, and that the criminal shall not be tried for any but the crime for which he was demanded.

EXTRADOS (-trā'dos), the external outline or curve of an arch.

EXTRAVAGANZA, in music, the drama, etc., a species of composition designed to produce effect by its wild irregularity and incoherence; differing from a burlesque in being an original composition and not a mere travesty.

EXTRAVASATION, an escape of some fluid, as blood or urine, from the vessel containing it. Blood extravasation, in contusions and other accidents, is when blood-vessels are ruptured by the injury, and the blood finds its way into the neighboring tissues. In some accidents to the urethra and bladder extravasation of urine is a very serious occurrence.

EXTREME UNCTION, since the 12th century, one of the seven sacraments of the Catholic Church. It is performed in cases of mortal disease by anointing in the form of a cross, the eyes, ears, nose, mouth.

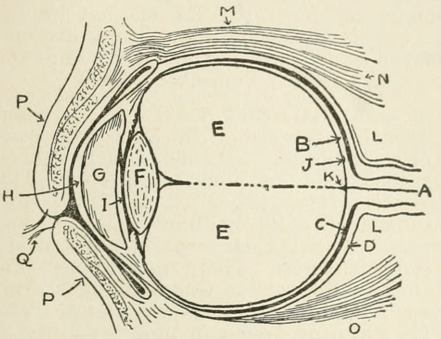
EXUMAS, a group of islands of the British West Indies, forming a part of the Bahamas. The chief islands are Great Exuma, Little Exuma, and the Exuma Keys, with a total area of 150 square miles. Little Exuma has an excellent harbor. The inhabitants are employed chiefly in agriculture, and the making of salt. Pop. about 4,000.

EYCK, HUBERT VAN (īk), a noted Flemish painter; born in Maaseyck, near Liège, Belgium, in 1366. It has been claimed that he and his brother JAN were the inventors of oil painting. For transparent and brilliant coloring and minute finish their works have never been surpassed. Their masterpieces are for the most part in Ghent, Bruges, Antwerp, Berlin, Munich, and Paris. The only painting that can now certainly be assigned to Hubert is the altar-piece with folding doors, "The Adoration of the Lamb," begun by him and finished by Jan, and afterward presented to the Cathedral of St. Bavon, Ghent, where only the two central divisions now remain, the wings being in the Gallery at Berlin, with the exception of those representing Adam and Eve, which are in the Brussels Museum. Hubert died in Ghent, Flanders, Sept. 18, 1426.

EYCK, JAN VAN, a Flemish painter, brother of HUBERT; born in Maaseyck, about 1386. He was court painter of Philip the Good, Duke of Burgundy, and practiced his art chiefly at Bruges. In the National Gallery, London, there are three pictures of Jan van Eyck. These are portraits of Jean Arnolfini and Jeanne de Chenany, his wife — signed and dated 1434; the portrait of a man in a cloak and fur collar, with a red handkerchief twisted round the head as a turban—painted Oct. 21, 1433; and the portrait of a man with a dark-red dress and a green head-covering—signed and dated Oct. 10, 1432. In the Louvre is his exquisitely finished little picture of "Chancellor Rollin kneeling before the Virgin." Jan died in Bruges, July 9, 1440, and lies buried in St. Donatus Church.

EYCK, MARGARET VAN, a Flemish painter, sister of HUBERT and JAN VAN EYCK. A "Virgin and Child," in the National Gallery, London, formerly assigned to her, is attributed to an unknown painter of the Early Flemish school. She is believed to have executed the miniatures in the missal of the Duke of Bedford. She died before 1431.

EYE, the organ of sight. The principle on which the human eye is constructed is that of the camera obscura, a dark chamber with a small opening for the admission of light, a quantity of black matter for the absorption of superabundant rays, and a nervous expansion on that wall which receives the rays of light. For protection it is deeply sunk



EYE—CROSS-SECTION OF HUMAN EYE

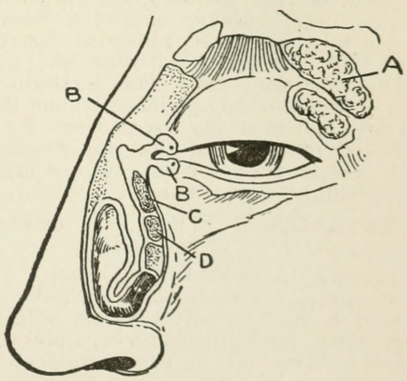
A. Optic nerve
B. Retina
C. Choroid
D. Sclera
E. Vitreous humor
F. Lens
G. Aqueous humor
H. Cornea
I. Iris
J. Fovea centralis
K. Arteria centralis retinæ
L. Orbital fat
M. Levator palpebræ superioris muscle
N. Rectus superior muscle
O. Rectus inferior
P. Eyelids
Q. Eyelashes

in a fatty cushion within a bone cavity. The human eye is nearly globular, but the anterior part formed by the cornea is part of a smaller sphere, and slightly protuberant, in the proportion of 20 to 19. In the globe itself the chief constituents are: (1) The retina, the expansion of the optic nerve; (2) the transparent refracting media (the vitreous body or humor, the crystalline lens, the aqueous humor, the iris, and the pupil); (3) the tunica sclerotica, forming a dense tunic inclosing the first two. It is opaque except in front, where it becomes (4) the cornea, perfectly transparent, to allow the light to enter (5) the choroid membrane, lying between the retina and sclerotica, and containing a layer of dark pigment. The vitreous humor is immediately within the cup formed by the retina, and gives the support inside which the sclerotica does outside; it forms four-fifths of the whole globe, and its perfect fluidity allows for the expansion and contraction of the pupil and of the lens itself to or from the cornea. The crystalline lens is divided into three equal parts by three lines, which radiate from the center to one-third of the surface; each one of these layers consists of hundreds of concentric layers, connected by finely serrated edges. This beautiful dove-tailing of fibers is not peculiar to man; the best example is the lens of the common codfish.

The eyes of the vertebrata are essentially like those of man. The eyes of insects are of two kinds: compound eyes and simple eyes or stemmata. The compound eyes are immovable. They consist of vastly numerous lenses; thus in the dragon-fly there are 12,000. Spiders have compound eyes; the higher members of the class have ocelli; many of the lower parasitic species are blind. The eyes of crustacea vary greatly, from a sessile median eye-speck to two distinct eyes placed on movable peduncles. The centipedes have many simple eyes; in *Iulus* these are so near as almost to make two compound eyes. Of mollusks, the cephalopoda have large eyes, the gasteropoda possess them, as do the pectens among the conchifera, though in most other genera of the class, and in brachiopoda, they seem wanting. The animals of lower organization are destitute of eyes.

In Architecture. — (1) The circular aperture in the top of a dome or cupola. (2) The circle in the center of a volute scroll. (3) A circular or oval window.

In Nautical Parlance. (1) A circular loop in a shroud or rope. A worked circle or grommet in a hank, rope, or sail. (2) The loop of a block-strap. (3) The hole in the shank of an anchor to receive the



EYE—CROSS-SECTION OF HUMAN EYE

A. Lachrymal gland
B. Lachrymal canal
C. Nasal sac
D. Nasal duct

ring. The foremost part of the bows of a vessel, on which formerly eyes used to be painted. The term is also applied to the hawse-holes. The strands of a rope's end opened and divided into two parts and laid over each other, marled, parceled, and sewed together, and so forming an eye, is called a Flemish eye.

EYE STRAIN, the condition occasioned as a result of using the eyes where the light is bad or the conditions unfavorable. The adverse condition is often produced as a result of imperfect balance of the ocular muscles, and the results are sometimes serious. There is always a waste of nerve force and there is often headache; but where the condition is prolonged, convulsions, chorea, hysteria, and dementia may be among the consequences. The malady may be remedied by the use of proper glasses, and on the other hand it may be aggravated by the use of improper glasses. Where the painful condition is the result of constitutional defects, a normal condition may be brought about by surgical operation.

EYLAU (ī'lou), a town of 3,600 inhabitants, 23 miles S. of Königsberg by rail. Here Napoleon encountered the allies—Russians and Prussians—under Bennigsen, Feb. 8, 1807. Darkness came on while the contest was still undecided; but as Napoleon had a considerable force of fresh troops close at hand, the allies retired during the night on Königsberg. Their loss is estimated at about 20,000; that of the French is set down at 10,000, but must have been considerably greater. The place is called Preussisch-Eylau, to distinguish it from Deutsch-Eylau, a town of about 5,000 inhabitants, 89 miles N. E. of Bromberg.

EYRA (ī'rä), in Scandinavian mythology, the physician of gods.

EYRE, EDWARD JOHN (ar), an Australian explorer and colonial governor; born in August, 1815. He emigrated to Australia at the age of 17. In 1840 he failed in an attempt to explore the region between South and Western Australia, though he discovered Lake Torrens. He accomplished the task in 1841. In 1846 he became lieutenant-governor of New Zealand, and in 1854 of St. Vincent in the West Indies. In 1864 he was appointed governor of Jamaica, where in 1865 negro disturbances broke out. The outbreak was suppressed with rigid severity. A commission sent to inquire, found that Eyre had acted unjustly in one case and he was recalled. On his return he was prosecuted by a committee of whom John Stuart Mill was the most prominent; Thomas Carlyle, Charles Kingsley, and Sir R. Murchison promoted the Eyre defense fund. The prosecutions could not, however, be sustained; and eventually in 1872 the government refunded to Eyre the costs of his defense. He died Dec. 1, 1901.

EYRE, LAKE, a salt lake of South Australia, lying due N. of Spencer Gulf, at a depression of 38 feet, and with an area of 3,706 square miles. Except in the season of rains, this lake is generally a mere salt marsh. It was discovered in 1840 by Eyre.

EZEKIEL, one of the greater prophets, to whom is attributed one of the larger prophetic books of the Old Testament, the visions and utterances which it contains being expressly attributed, in the work itself, to Ezekiel. He was the son of Buzi, a priest (i: 3). He was carried captive, in the time of Jehoiachin, 595 B. C., about 11 years before the destruction of Jerusalem under Zedekiah (xl: 1). There is no direct quotation from Ezekiel in the New Testament, but there are a few allusions to his utterances, especially in the Book of Revelations. The genuineness and authenticity of the prophecies of Ezekiel have not been seriously impugned either in the Jewish or Christian Church.

EZRA, BOOK OF, an Old Testament book. The name Ezra is by most persons held to denote that he was the author of the book. It may, however, signify no more than that the doings of Ezra are the main theme of the book, which is certainly the case. The illustrious personage so designated was a priest descended from Phinehas, the son of Aaron. His immediate father was Seraiah. He was a ready scribe in the law of Moses. An exile in Persia, he so commended himself to the then reigning monarch (apparently Artaxerxes Longimanus), as to obtain from him a commission to lead the second expedition of Jews back to their own land. The enterprise began about 458 B. C. Subsequently we find him again at Jerusalem, exercising only priestly functions under Nehemiah. Where he died is uncertain. The period which the book spans is about 80 years, viz., from the first of Cyrus, 536 B. C., to the eighth of Artaxerxes Longimanus, 456 B. C. Both Jews and Christians consider the work part of the Scripture canon.

F

F, f, the sixth letter, and fourth consonant of the English language, is a labial or labiodental articulation, being formed by the emission of breath between the lower lip and the upper teeth. It is a surd spirant, the corresponding sonant spirant being V (*q. v.*). In Anglo-Saxon it was pronounced as v, and it still retains that sound in of. It takes its form from the Greek digamma, which had a very similar power. An original f has frequently become v in English words, as vat for fat, vetch for fetch, vixen for fixen. It has also disappeared from many words, as in head (O. Eng. *heved*), lord (O. Eng. *hlaford*), hawk (O. Eng. *hafoc*), woman (O. Eng. *wifman*), etc., and in others it has been dropped, as hasty (O. Fr. *hastif*), jolly (O. Eng. *jolif*), testy (O. Eng. *testif*), etc. An f sound is now used in trough, enough, and rough, to represent an original guttural. In the plurals of nouns of pure English origin ending in -f or -lf, with a preceding long vowel (except oo), the f is changed into v. In Romance words the f remains unchanged, and the plural is formed by adding s. Words ending in -ff or -rf, also form the plural by the addition of s. In Russian the letter f is uniformly used to represent the sound of th, as Feodor for Theodore.

F as an initial is used:

1. In music: For forte, to mark that a passage is to be played or sung loudly; ff=fortissimo, when it is to be played or sung very loudly.

2. In distinctions: For Fellow, as F. R. S.=Fellow of the Royal Society.

3. In medicine: For the Latin word *Fiat*=let it be made.

F as a symbol is used:

1. In numerals: For 40, and with a dash over it (F) =40,000.

2. In chemistry: For the non-metallic element, fluorine, and for fluoride—*e. g.*, F=fluorine, KF=potassium fluoride. Sometimes F written with a stroke above is used for formic acid.

3. In music:

(1) For the note called parhypate in the Greater Perfect system of the Greeks. The letter name of Frite in the upper tetrachord.

(2) The first note of the Eolian mode, or church scale, commencing four notes above the hypo-Eolian.

(3) The note called Fa ut in the hexachord system. The fourth note in the scale of C.

(4) The keynote of the major scale requiring one flat in the signature; and the keynote of the minor scale related to A flat.

(5) For the note Fah in the Tonic Sol-fa notation.

4. In Bibical criticism: F for the Codex Augiensis; f (small letter), for the Cursive MSS.

5. In physics: For Fahrenheit, denoting that the degree of temperature is according to that scale, as 60° F.

6. In old law: F was branded on felons who were admitted to benefit of clergy.

7. In heraldry: For the FESSE-POINT, the central point of the escutcheon.

FABER, FREDERICK WILLIAM, an English hymn-writer; born in Calverley, England, June 28, 1814. He was long in the Anglican priesthood, and wrote hymns of singular sweetness and spirituality; going over at last to Rome. Among his most familiar hymns are: "Hark, Hark, My Soul"; "O Paradise! O Paradise!"; "There's a Wideness in God's Mercy"; "Sweet Saviour Bless Us Ere We Go"; etc. He died in the Oratory, Brompton, Sept. 26, 1863.

FABER, WILLIAM FREDERIC, an American Protestant Episcopal bishop, born in Buffalo, N. Y., in 1860. He graduated from the University of Rochester in 1880 and from the Albany Theological Seminary in 1883. In the same year he was ordained to the Presbyterian ministry, and until 1892 was pastor of the First Church of Westfield, N. Y. In the latter year he entered the Protestant Episcopal Church and served as rector

in churches in New York and Michigan. He was consecrated coadjutor-bishop of the Diocese of Montana in 1914, and became bishop in 1916. He wrote "The Church for the Times" (1891); "Henry VIII. and the Reformation in Relation to the Church of England" (1897); and was a frequent contributor to magazines on religious subjects.

FABIAN SOCIETY, an organization in England, with headquarters in London, whose members are interested in the reorganization of society on a socialistic basis. In 1883 an American, Thomas Davidson, who was temporarily residing in London, made a practice of conferences, at which questions of social reform were discussed. From these informal meetings sprang the Fabian Society, so named after the Roman General Fabius, who by his tactics of delay saved Rome from invasion and capture. By this name it was indicated that the members of the society were in favor of evolutionary means to accomplish their ends, rather than revolutionary, or violent means. The leading figures in the activities of the Fabian Society have been the two Webbs; Mr. and Mrs. Sidney Webb, two brilliant writers on economics, who have done more than any others to shape the politics of the Fabian Society. Other prominent members have been Bernard Shaw, H. G. Wells and Mrs. Annie Besant. The Fabian Society has stood for state socialism, and has published a number of volumes of essays by its members, advocating the gradual extension of government functions in public utilities and industry. Since the war, however, this principle of reform has grown into disfavor, especially among the labor organizations, which have had a tendency toward syndicalism, or modifications of that theory, which implies the management of industry by labor organizations. The Fabian Society, also, has shown a broader interest in other plans for collectivist reorganization, especially in the direction of consumers' co-operation.

FABIUS, the name of one of the oldest and most famous families of Rome, every member of which was massacred at Cremera, 478 B. C., except QUINTUS FABIUS VIBULANUS, who became one of the decemvirate. After him are mentioned FABIUS AMBUSTUS, dictator, 350 B. C. FABIUS RULLIANUS, to whose name MAXIMUS was added, twice dictator, conqueror of the Samnites and Etruscans, 323-280 B. C.. FABIUS GURGES, son of the preceding, consul of Rome. FABIUS PICTOR, the first writer of Roman history, 3d century, B. C. FABIUS MAXIMUS VERRUCOSUS, considered the greatest of his family, surmamed "Cunctator," "the Delayer," on account of his system of warfare. He died in 203 B. C. FABIUS MAXIMUS QUINTUS, son and next in office to the preceding, afterward consul. FABIUS MAXIMUS ÆMILIANUS, distinguished in the war of Persia and in Spain, consul 147 B. C. FABIUS MAXIMUS SERVILIANUS, pro-consul for Spain, censor 126 B. C. FABIUS MAXIMUS ALLOBROGICUS, consul 122 B. C.

FABLE, any fictitious narrative; more particularly a kind of literary composition, either prose or verse, in which a short fictitious story is made to convey practical rules of prudence or wisdom. The fable consists properly of two parts —the symbolical representation, and the application of the moral of the tale. Among the most celebrated fables of the East, where this species of composition seems to have originated, are the Indian fables of Pilpay, or Bilpai, and the more eager Arabic collection of Lokman, who is said to have lived in the time of King David. Among the Greeks, the fables of Æsop were well known, but many of those that were current in Greece under his name are identical with those of the East. In Latin, Phædrus has left about 90 fables of considerable merit in imitation of Æsop; but the well-known fable of "the town-mouse and the country-mouse," related by Horace, is the best in that language. During the Middle Ages the fable was not entirely neglected; "Reynard the Fox," a famous mediæval epic, may be considered as a sort of extended satirical fable. Among the most distinguished of the later fable-writers are Gellert, Gleim, and Lessing of Germany, and Gay of England, but pre-eminent among all the modern fabulists, for his delicate sarcasm and his lively wit, is the French La Fontaine.

FABRE, JEAN HENRI, a French entomologist and writer; born at Saint-Léons, Avignon, in 1823. For several years he taught in the Lycee of Avignon and afterward served as Professor of Physics at the College of Ajaccio. He retired from teaching, however, to devote himself entirely to the study of entomology and from 1879 to 1907 he devoted himself to writing the great work in ten volumes, entitled "Souvenirs entomologiques." This was crowned by the Institute. The greater part has been translated into English. He wrote "The Life of the Insects" (1910) and many other works. He was a corresponding member of the Institute and Chevalier of the Legion of Honor. Among his works translated into English are "Insect Life" (1901); "The Life and Love of the In-

sect" (1911); "Social Life in the Insect World" (1913); "The Life of the Spider"; and "The Life of the Fly" (1913).

FABRICIUS, CAIUS, surnamed Lucinus, a Roman general who was twice consul and gained several victories over the Samnites and Lucanians. He was famed for his integrity and contempt of riches. This was shown during his embassy to Pyrrhus in 280 B. C., when he firmly withstood all the attempts of Pyrrhus to buy his service. When consul, he discovered to Pyrrhus a plot formed to poison him by his physician; and in gratitude Pyrrhus released the Roman prisoners without ransom. Fabricius was afterward censor, and endeavored to check the growing passion for luxury. He lived a simple life and died poor.

FAÇADE (fa-sad'), the face or front of any building of importance. It may be applied to any side of a large quadrangular building embellished with sufficiently striking architectural features, but it is usually confined to the principal front, in which the chief entrance is most frequently, if not always, situated.

FACIAL NERVE, a nerve of the seventh pair of cranial nerves, a motor nerve which supplies the muscles of expression on either side of the face. Paralysis of this nerve produces facial paralysis.

FACTOR, an agent or substitute, especially a steward or agent of an estate, appointed by a landowner to manage the estate, collect rents, let lands, etc.; also an agent employed by merchants to transact business for them in other places, as to buy and sell, to negotiate bills of exchange, etc. He differs from a broker in that he is intrusted with the possession and disposal of the goods, property, etc., and may buy and sell in his own name.

One of several circumstances, elements, or influences on which a certain result depends, and which have to be taken into consideration in estimating the probable results of any events.

In algebra, a name given to any quantity which constitutes an algebraical expression: thus $a + b$ and $a - b$ are factors of the product $a^2 - b^2$.

In arithmetic, the multiplier and the multiplicand; the numbers from the multiplication of which the product results.

Prime factors in mathematics, the prime factors of a quantity are those factors which cannot be exactly divided by any other quantity except 1. Every number has 1 for a prime factor. The prime factors of 12 are 1, 2, 2, and 3.

FACTORIES AND THE FACTORY SYSTEM, the basis of modern industry. The change from the old handicrafts system of manufacturing, in which practically all the needs of life were manufactured by individual men in their own homes, to the present factory system, where commodities are manufactured in great quantities by a large number of people co-operatively, was primarily caused by the invention of steam-driven machinery. Factory production may be said to have begun with the invention, by James Hargreaves, of the spinning jinny, a machine which obviously could not be operated by one person. The invention of the jinny, spinning vast quantities of yarn, naturally stimulated the efforts which resulted in the invention of machinery for weaving. These machines were put up in one large building, and gradually the entire process of manufacturing cloth by machinery was carried on in the one factory. Further inventions carried the system into the production of other commodities, and so gradually changed the whole basis of industry, the hand tools being gradually scrapped and the workers becoming the attendants of the machines instead.

The speed resulting from the use of machinery was merely one of the big gains achieved through the new system. There was also the great economy resulting from organization. Under the handicrafts system one man carded the cotton, another spun it, and a third wove it, and between each process there was the delay necessitated by the removal of the material from one house to another. Each of these transfers of material, in fact, amounted to a separate commercial transaction, since the one handicraftsman purchased it from the other, until the weaver finally sold the finished cloth to the merchant. In the factory the material passed quickly from one machine to another, in a continuous stream.

This economy of labor and time has progressed equally with the invention of new machinery. Each process involved in the manufacture of any commodity represents a separate operation. Each workman, with the aid of machinery, is continuously employed on the one process, without having to pass from the one to the other. This in itself makes for speed, and also eliminates the skill needed in the entire manufacture of one article by one operator. This economy of organization has probably been brought to its highest degree of efficiency in this country, in the production of automobiles, as in the Ford factories of Detroit, and the manufacture of watches, as in the case of the cheap Ingersoll watches. Here the vast scale on which

production is carried on is another element of economy, since the minutest operation becomes the work of an entire department of the plant by itself. Another illustration of the efficiency of the factory system is seen in the killing and dressing of meats by the large packing houses of this country. Where the killing was formerly done by the independent small butcher, one man could kill and dress only a very few pigs or beeves in one day. Under the factory system thousands are killed and dressed by a correspondingly small number of men, each motion involved being performed with lightning speed by one man.

It was in England and Scotland, where machinery was first applied to manufacturing, that factories were first established. But the system followed very soon after in this country, especially in New England, where the many small streams and the rivers furnished hydraulic power for the machinery. The first factory in which the entire series of processes involved in making finished cotton cloth out of the raw material were carried on under one roof was put into operation in Waltham, Mass., in 1814. Similar textile mills were soon established all over New England and, after the Civil War, were introduced in the South, with Northern capital.

The chief result of the factory system of industry has been the tremendous cheapening of the cost of production. As an instance, in the days of handicrafts industry, in England, woolen goods were cheaper than cotton, because wool was a home product and cotton must be imported from abroad. So little was the amount of goods which could be produced under this system that the scarcity of wool as compared to cotton had no influence in raising the cost.

The cheapening of the cost of production as a social gain, however, has been more than offset by the evils which the factory system has worked on the working classes. First of all, the large majority of skilled artisans were thrown out of employment. Unskilled labor was found quite as suitable as skilled, and, furthermore, in the manufacture of a given commodity much greater quantities could be produced by one-tenth as many workers, the machinery doing most of the actual work. Then it was found that women and children could serve quite as well as men in attending the machinery, and large numbers of men were left out of employment. Added to this, the workers could now only find employment under the roofs of the masters, who owned the machines and the factories, and so they came under their personal autocratic control. With this came a gradual reduction of wages, also brought about by the keen competition for work among the workers themselves, a natural result from the fact that only a portion of them were needed to work in the factories. Thus there was a tendency to lower wages to a point where they could only sustain the lives of the cheapest workers, the women and children, and the hours of labor were extended to the limits of human endurance.

These inhuman tendencies were first checked by legislation, known as the famous Factory Acts, which first of all shortened the hours of labor (see EIGHT-HOUR DAY). Afterward, both in England and this country, came legislation indicating minimum wages for women and children, and, in rarer instances, for men as well.

Another, and even stronger, check on the evils of factory labor has been the gradual growth in power of labor organizations. The organized workers, through their economic organizations, have brought such pressure to bear on the manufacturers that gradually conditions have been improved.

FACTORY INSPECTION, the need of special factory legislation was first brought about by the fact that machinery, by reducing the need of labor, and throwing an increasing number of workers out of employment, created competition among the workers themselves (see FACTORIES AND FACTORY SYSTEM). This created a continuous tendency toward reduced wages, long hours of employment and a disregard for sanitary conditions. Still more important, the elimination of the need of skilled workers brought women and children into the factories in competition with men.

It was one thing to pass legislation correcting these evils; it was quite another matter to enforce it. Thus, following all this labor legislation came the need of competent inspectors to see that the laws were being enforced. Gradually it has been realized that factory inspection had even a bigger function than that. The competent inspectors were those who not only saw that the letters of the laws were being enforced, but who could intelligently observe the results of their enforcements. Where certain legislation fails to correct the abuses it has set out to cure, the fact should first be made known through the reports of the inspectors. It is also the function of a competent inspector to indicate the cause of such failures, and recommend new laws which will correct the faults.

After the first Factory Acts were passed in England, in 1802, the local judges appointed visitors. In 1833, the need of experts being felt, four special inspectors were appointed, their number being increased to nine in 1842. These have since been increased to hundreds, directed from the Home Office.

In the United States factory inspection, naturally, is carried on by the separate States, each of which has passed its own set of labor laws. Practically every State of the Union now carries on some form of factory inspection. Usually this is directed by a special department of labor, but in Massachusetts this function is under the jurisdiction of the police. In other States independent bureaus carry on factory inspection. Every year sees legislation passed to enlarge the jurisdiction of the factory inspection staffs. In 1919 Connecticut, New York, Missouri, and West Virginia enlarged their forces of inspectors. New Jersey, Washington, and North Dakota established special mine inspection bureaus. California empowered its industrial Welfare Commission to issue subpœnas and administer oaths, while Minnesota authorized its inspectors to enter the offices as well as the workrooms of the establishments they inspected.

FACULTY, the power or ability of doing anything; capacity for any natural action or function; ease or dexterity in performance, possessed naturally or acquired by practice; one of the powers of the mind or intellect, enabling it to receive or retain perceptions; as, the faculty of imaging, remembering, etc. In ecclesiastical law, a privilege or license granted to any person by favor, and not as a right to do any act which by law he may not do. In mental philosophy, a natural and active power of the human mind, as distinguished from a passive one, the latter approximately called capacity or receptivity. In the Roman Catholic Church, permission granted by an ecclesiastical superior to a duly qualified subject to hear confessions. Such permission only extends to the district over which the superior has jurisdiction. Thus, faculties are granted by bishops to the priests of their dioceses, and by the heads of religious houses to such of their subjects as they judge qualified to hear the confessions of the community.

In the United States, the term faculty indicates the body of persons who are intrusted with the government and instruction of a university or college as a whole, comprising the president, professors, and tutors. It is also used for the body of masters and professors of each of the several departments of instruction in a university; as, the law faculty, etc.

FÆCES, the excrementitious contents of the bowels, the refuse of the food and aliment, and sometimes called alvine discharges, or the dejecta; also, sediments; dregs; lees; settlings after distillation and infusion.

FAENZA (fa-aint'sa), a city of Italy, 20 miles from Ravenna. It was once well known for its manufacture of colored and glazed earthenware called FAIENCE (*q. v.*). Its chief industries are now the making of paper, silk twist, and fabrics. Faenza, the ancient Faventia, was at one period a town of the Boii, but afterward a municipium under the Romans, and was annexed to the States of the Church in the 15th century by Pope Alexander VI., in which condition it remained till 1860, when, with the Emelian provinces, it was annexed to the Kingdom of Italy. Pop. (1901) 22,239.

FAEROE ISLANDS. See FAROE ISLANDS.

FAHRENHEIT, GABRIEL DANIEL, a German natural philosopher; born in Danzig, Prussia, May 14, 1686. He was a maker of scientific instruments, and in 1720 introduced the use of mercury instead of spirits of wine in the construction of the THERMOMETER (*q. v.*).

FAIDHERBE (fā-darb), **LOUIS LÉON CÉSAR**, a French military officer; born in Lille, France, June 3, 1818. His apprenticeship as a soldier was passed in Algiers and Guadaloupe. He went to Senegal in 1852; became two years later governor of the colony, and extended the colony by the subjugation of the Moorish Trarza in 1858, and of the country of Cayor in 1861. Faidherbe was summoned to France in December, 1870, and given command of the Army of the North. After successfully withstanding Manteuffel's attack near the Hallue river, Dec. 23, he was severely beaten near St. Quentin, Jan. 19, 1871. After the conclusion of peace, he was dispatched by the French government to Upper Egypt to study the monuments and inscriptions. He became a member of the National Assembly in 1879. Faidherbe published books on the language, geography, and archæology of northern Africa, chief among which are two collections of "Numidian Inscriptions" (1870-1872); "Anthropology of Algiers" (1874); "Phœnician Epigraphy" (1873); "The French Soudan" (1884); a work on Senegal (1889). His "Campaign of the Army of the North" appeared at Paris in 1871. He died in Paris, Sept. 29, 1889.

FAIENCE, a fine kind of pottery originally made in imitation of majolica. The different kinds of faience are produced by the use of common or of fire-clay; the admixture of sand with the clay, as in Persian ware; the use of a transparent or of a colored glaze; of an opaque or translucent enamel, or by a combination of these processes on the same piece.

FAILSWORTH, a city of Lancashire, England. It is on the Lancashire and Yorkshire railway. It has important manufactures of cotton. Pop. about 17,000.

FAIOUM, or **FAYOUM**. See FAYUM.

FAIRBAIRN, SIR WILLIAM, a Scotch civil engineer; born in Kelso, Scotland, Feb. 19, 1789; entered business in Manchester, England, in 1817. He constructed the first iron ship in England and afterward his firm built over 100 iron vessels. He was associated with Robert Stephenson in designing and building the great tubular bridge over Menai Strait. He was the author of "Iron, Its History and Manufacture"; "Iron Shipbuilding"; "Useful Information for Engineers"; "An Experimental Inquiry Into the Strength, Elasticity, Ductility, and Other Properties of Steel" (1869); etc. He died Aug. 18, 1874.

FAIRBANKS, a city of Alaska on the Tanana river. It is the chief city of the territory and is the site of the Fourth Judicial District and of government activities in the interior of Alaska. It is the center of the important Fairbanks gold-mining district. It is a well-built city and has schools, churches, hospitals, and wireless and telephone connection with the outer world. It is the shipping point for miners' supplies. It has all the characteristics of an important city. The principal section of the new Alaskan railroad is the one from Chitina to Fairbanks, 313 miles. See ALASKA.

FAIRBANKS, ARTHUR, an American art director, born in Hanover, N. H., in 1864. He graduated from Dartmouth College in 1886 and attended the Yale Divinity School and the Union Theological Seminary. He also studied in Germany. He was on the faculty of Dartmouth College and Yale and Cornell Universities until 1900, when he became professor of Greek literature and archæology at the University of Iowa. In 1906, he was appointed professor of Greek and Greek archæology in the University of Michigan. He was in the following year appointed director of the Boston Museum of Fine Arts. He was a member of many classical and learned societies. He wrote "Introduction to Sociology" (1896); "The Mythology of Greece and Rome" (1907); "Handbook of Greek Religion" (1910); "Greek Gods and Heroes" (1915).

FAIRBANKS, DOUGLAS, an American actor, born in Denver, Colo., in 1883. He was educated at the Jarvis Military Academy in Denver, and at the Colorado School of Mines. He made his first appearance on the stage in New York in 1901 and afterward appeared as a star in several successful plays. His chief success, however, was won as a moving-picture actor, in which he attained great prominence, both in the United States and other countries.

FAIRBURY a city, of Nebraska, the county-seat of Jefferson co. It is on the Chicago, Rock Island, and Pacific, the Burlington, and the St. Joseph and Grand Island railroads, and on the Little Blue river. It has important manufactures and is the center of an important fruit-growing region. There are a library, postoffice, and other public buildings. Pop. (1910) 5,294; (1920) 5,454.

FAIRCHILD, CHARLES STEBBINS, an American public official, born at Cazenovia, N. Y., in 1842. He graduated from Harvard University in 1863, and after studying law was admitted to the bar in 1865. He was deputy attorney-general of New York in 1874, and attorney-general in 1876-1877. In 1885 he was assistant secretary of the Treasury in President Cleveland's Cabinet, and became Secretary of the Treasury in 1887. He was an officer and director in many important financial institutions.

FAIRFAX, THOMAS, LORD, a British military officer; born in Denton, England, Jan. 17, 1611. He was the eldest son of Ferdinand, Lord Fairfax. On the first breaking out of the civil discontents, following the example of his father, Fairfax embraced the popular side, and ranged himself as one of the firmest opponents of the royal party in Church and state. On the commencement of hostilities, he was commissioned by the Parliament to act as general of the horse under his father, who was made commander in the north. After the passing of the "Self-denying ordinance," Fairfax was appointed general, conjointly with Cromwell. He and Skipton commanded the main body of the Parliamentary army at the battle of Naseby; after which he marched with a powerful division to the W. counties; and, having reduced Exeter and other important towns, proceeded to lay siege to Oxford. His conduct on all occasions,

was marked by the highest sense of honor and humanity. During the Commonwealth Cromwell treated him with contempt. After Cromwell's death, when it became evident that the restoration of the monarchy was the general wish, he came forward to co-operate in bringing about that event. It was through his influence mainly that the Irish brigade forsook Lambert and joined Monk's army. Fairfax then seized York on the royal behalf; was made a member of the healing Parliament; and was nominated head of the committee appointed to wait upon Charles II. at The Hague and invite him to the throne of England. On the Restoration he withdrew altogether from active life. He wrote "Short Memorials" of his life, etc. He died near York, England, Nov. 12, 1671.

FAIRFAX, THCMAS, 6th Baron of Cameron; born in England in 1691; was educated at Oxford and was a contributor to Addison's "Spectator." Disappointed in England, he came to America and settled on a vast landed estate in Virginia which he had inherited from his mother, a daughter of Lord Culpeper. It was there, at Greenway Court, that Washington first met him. Between the two there sprang up a warm friendship, and when, years later, he learned that Washington had captured Cornwallis, he was overcome with emotion, and called to his body-servant to carry him to his bed, "for I am sure," he said, "it is time for me to die." He died at his lodge, Greenway Court, in Frederick co., Va., Dec. 12, 1782.

The 11th Lord Fairfax and Baron of Cameron who succeeded his brother to the baronetcy in 1869, and who died in Northampton, Md., Sept. 28, 1900, like his American predecessors, made no claim to the title.

FAIRFIELD, a town and port of entry in Fairfield co., Conn., on Long Island Sound, and on the New York, New Haven and Hartford railroad; 52 miles N. E. of New York. It contains the Pequot and Memorial libraries, National and savings banks, a stone powder house and four other buildings constructed during the Revolutionary period. It was founded in 1639. In 1779 it was burned by Governor Tryon. Pop. (1910) 6,134; (1920) 11,475.

FAIRFIELD, a city of Iowa, the county-seat of Jefferson co. It is on the Chicago, Burlington and Quincy, and the Chicago, Rock Island and Pacific railroads. Its industries include the manufacture of agricultural implements, wagons, pumps, washing machines, gloves, brooms, etc. It is the seat of Parsons College, and has a court house, county jail, hospital, public library, and other public buildings. Pop. (1910) 4,970; (1920) 5,948.

FAIR HAVEN, a town in Bristol co., Mass.; on Buzzards Bay, at the mouth of the Acushnet river, and on the New York, New Haven and Hartford railroad; 60 miles S. of Boston and opposite New Bedford, with which it is connected by bridges. Here are the Millicent Public Library, several banks, churches, and a newspaper. It has manufactories of glass, castings, nails, and tacks. The British were here repulsed by Maj. Israel Fearing on Sept. 7, 1778. Pop. (1910) 5,122; (1920) 7,291.

FAIR ISLE, a small island in the North Atlantic, lying between the Shetland and Orkney Isles, 22 miles from Sumburgh Head. It is 4 miles long by a breadth of 2½. Here (1588) the Duke of Medina, admiral of the Spanish Armada, was shipwrecked.

FAIRMONT, a city of West Virginia, the county-seat of Marion co. It is situated on both sides of the Monongahela river, and is on the New York Central, the Monongahela Valley, and the Baltimore and Ohio railroads. The river is spanned by a steel bridge. Its industries include coal mining, and the manufacture of flour, lumber, iron, glass, cigars, etc. It is the seat of the State normal school, and has a hospital, training school for nurses, excellent school buildings, and the State miners' hospital. Pop. (1910) 9,711; (1920) 17,851.

FAIRMOUNT COLLEGE, an institution for higher education at Wichita, Kan., founded in 1892 as a preparatory school. It took its present form and name in 1896. In the autumn of 1919 there were 252 students and 19 instructors. President, W. H. Rollins, D.D.

FAIRY, a fay; an imaginary being or spirit, supposed to assume a human form, dance in meadows, steal infants, and play a variety of pranks; an enchantress. In the traditional mythology of the nations of western Europe, fairies (the elves of the Anglo-Saxons) were generally believed to be a kind of intermediate beings, partaking both of the nature of men and spirits, having material bodies, and yet possessed of the power of making themselves invisible. They were remarkably small in stature, with fair complexions, and generally clothed in green. Their haunts were believed to be groves, verdant meadows, and the slopes of hills; and their great diversion, dancing hand-in-hand in a circle. The traces of their tiny feet were sup-

posed to remain visible on the grass long afterward, and were called FAIRY RINGS or CIRCLES (*q. v.*). They were regarded as being sometimes benevolent and sometimes mischievous. Croker in his "Fairy Legends and Traditions of the South of Ireland," describes them as being "a few inches high, airy, and almost transparent in body; so delicate in their form that a dewdrop, when they chance to dance upon it, trembles, indeed, but never breaks." They are supposed to live in large societies, governed by a queen; and the peasantry never speak of them but with caution and respect, as the good people and friends, believing them to be present and to hear what is said. The fairy superstition belongs to modern Europe. The pure fairy tales first became popular in the latter part of the 17th century, and the Italians appear to have been the first to take the lead. They afterward became very popular in France; and, at the present, they are more extensive and popular in Germany than in any other country.

FAIRY RINGS, or CIRCLES, rings occasionally observed in pastures, and usually attributed by the peasantry of western Europe to the dancing of the fairies. They are now known to be occasioned by the growth of certain kinds of fungi, which, proceeding outward from a center, render the soil for a time unfitted for the nourishment of grass.

FAITH, that assent or credence which we give to the declaration or promise of another, on the authority of the person who makes it. Faith is the means by which we obtain a knowledge of things which do not come under our own observation—things not seen; and in this way faith is distinguished from sight. Faith is also distinct from reason, in so far as it deals with matters which we cannot comprehend by our reason; but, at the same time, while we exercise faith, we must also exercise reason; for it is impossible to exercise an acceptable faith without reason for so exercising it. The term faith is used in theology for the assent of the mind to the truth of what has been revealed to us in the Holy Scriptures.

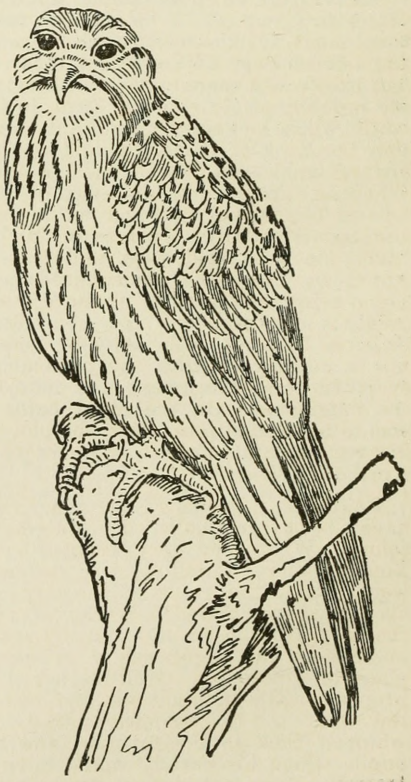
In mythology, Fides was deified by the Romans, and had a temple dedicated to her as early as the time of Numa Pompilius. She is at times represented with a basket of fruit in one hand and ears of corn in the other; but her usual symbol is two hands clasped together.

FAKIR, a Mohammedan religious mendicant. Among Anglo-Indians, and even among the Hindus, it is often used for a native mendicant of any faith; but specifically it is one of the Mohammedan religion; a Hindu mendicant being better called a Gosavee. Mohammendan fakirs in the East either live in communities or are solitary. The latter wander from place to place, are of filthy habits, and are regarded by the unthinking Mohammedan multitude as men of great sanctity.

In the United States, fakir is a slang name given to one of the numerous street merchants and mountebanks.

FALAISE (fa-lais'), a town of France, department of Calvados, 15 miles from Caen. The castle, which stands on a precipice, and in which William the Conqueror was born in 1024, is in ruins, with the exception of a tower.

FALCON, FAUCON, FAUCOUN, or FAULCON (fâ'kn), one of the *Falconinæ*, a sub-family of the FALCONIDÆ. The beak is short, toothed, curved from the base with one or two strong indentations on the margin on each side; wings



SAKER FALCON

very long. The best-known species is the peregrine falcon. It has always been held in the greatest esteem for hawking. It is of a bluish-gray color, narrowly

barred with black. Technically in falconry the female alone is termed a falcon, the male, which is smaller and less courageous, being known as a tersel or tiercel.

FALCONET, a little falcon; a name applied to a genus of tiny falcons, belonging to the sub-family *Falconinæ*, peculiar to the East Indies. One, *Microhierax cærulescens*, is found in the Himalayas and Burmese countries. Not one of these little hawks is seven inches in length; they are said to be used by native chiefs for hawking insects and button quails, being thrown from the hand like a ball. They sit solitary on high trees, and, according to native accounts, feed on small birds and insects. The word was also formerly applied to a small piece of ordnance, having an outside diameter at the bore of 4¼ inches, length 6 feet, weight 400 pounds, and carrying a shot of about 2 inches diameter, and 1¼ to 2 pounds in weight.

FALIERO, or **FALIERI, MARINO** (fal-e-air'o, or ē), a Venetian noble; born about 1274, who succeeded Andrew Dandolo as Doge of Venice, in 1354. He had previously commanded the troops of the republic at the siege of Zara, in Dalmatia, where he gained a brilliant victory over the King of Hungary; and was afterward ambassador to Genoa and Rome. When he succeeded to the office of doge, he was 76 years of age, and had a young and beautiful wife. Jealous of Michael Steno, he quarreled with and was insulted by him at a masquerade; but Steno being sentenced to no more than a month's imprisonment for his offense, Faliero, burning with revenge, entered into a conspiracy with the plebeians to overturn the government and massacre the patricians. On the night before it was to be carried into effect, the plot was discovered, and Faliero was beheaded April 17, 1355.

FALISCI, a people of Etruria, said to have been originally a Macedonian colony. When they were besieged by the Roman general Camillus, a schoolmaster went out at the gates of the city with his pupils, and offered to betray them into the hands of the enemy, that, by such a possession, he might easily oblige the place to surrender. Camillus heard the proposal with indignation, and ordered the man to be stripped naked, and whipped back to the town by the very pupils whom his perfidy would have betrayed. This instance of magnanimity operated upon the people so powerfully, that they surrendered to the Romans.

FALK, PAUL LUDWIG ADALBERT, a noted German statesman; born in Metschkau, Germany, Aug. 10, 1827; was graduated at the Medical Department of the University of Breslau; elected as a Liberal to the Prussian Diet in 1858. When the states of the German Empire were consolidated he was appointed to codify the laws of the confederation. In February, 1871, he became Prussian Minister to the Federal Council. Later he was appointed Minister of Education and Worship. In January, 1873, he presented to the Prussian Chamber the scheme of ecclesiastical legislation known as the "May Laws." These laws were administered with such severity and particularly where they affected the various religious bodies, that a bitter religious conflict ensued. He resigned from the ministry July 14, 1879; and was president of the Provincial Court of Westphalia from 1882 till his death, in Hamm, Germany, July 7, 1900.

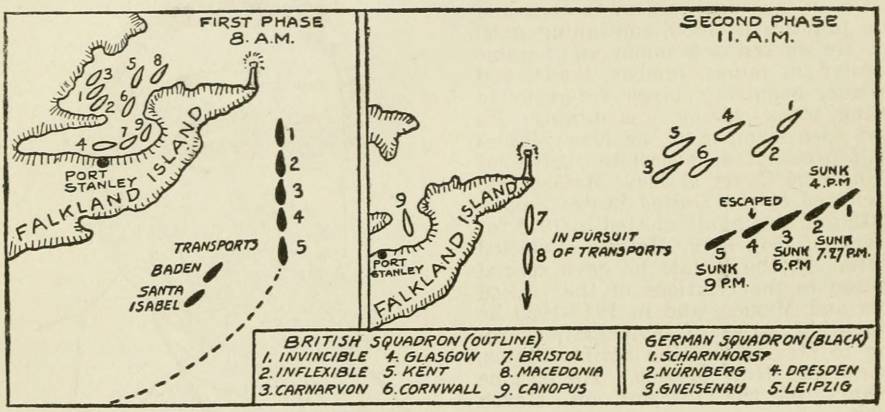
FALKENHAYN, ERICH G. A. S. VON, a German general, born in 1861. He graduated from the war academy in 1880 and was for three years military instructor in China. He was major of the German brigade of occupation in eastern Asia and was on the staff of Count von Waldersee during the operations of the German contingent at the time of the Boxer uprisings, in 1900. In 1912 he was Prussian Minister of War, and as such was a strong supporter of Lieutenant Forstner, against whom public opinion had been deeply aroused on account of his attack on a lame civilian in Zabern, the notorious "Zabern affair." In October, 1914, he replaced Von Moltke as Chief of the German General Staff, the latter having been relieved of his duties because of a disagreement over the tactics of the armies in France with the Emperor. General Falkenhayn was in command of the German-Austrian forces which invaded Rumania in 1916 by way of the passes in the Carpathians, effecting a junction with Von Mackensen in the south, on the banks of the Danube.

FALKIRK, a parliamentary and municipal burgh and market-town of Stirlingshire in Scotland. It is on the North British railway and is connected with the east and west coasts by the Forth and Clyde canal. Its seaport is Grangemouth, on the Firth of Forth, about three miles distant. The city has several notable buildings, including a town hall, free library, and a hospital. It is the center of the Scotch iron foundry trade. In the neighborhood are important coal mines and large distilleries. The town was founded in the 11th century, and in 1298 it was the scene of an important battle between the English under Edward I. and the Scotch under William Wallace,

in which the latter were defeated. Pop. (1911) 33,574; (1918) (est.) 35,251.

FALKLAND ISLANDS, two large islands, with a number of smaller ones surrounding them, in the South Atlantic Ocean. These islands were discovered by Davis in 1592, and came into the possession of the British in 1771. Their appropriation has been at times disputed; but since 1833 the British have held uninterrupted occupancy of them. Capital, Stanley; area, 6,500 square miles; pop. about 3,000.

FALKLAND ISLANDS, BATTLE OF, a naval engagement fought Dec. 8, 1914, between a British squadron led by Rear-Admiral Sir Frederick Sturdee and the German Far East squadron under Admiral Von Spee. On Nov. 1 of the same year the German squadron had met the



BATTLE OF FALKLAND ISLANDS, DEC. 8, 1914

British squadron under Admiral Cradock off the coast of Chile and had sunk the "Good Hope" and the "Monmouth," the "Glasgow" and the transport "Otranto" averting destruction by flight. It was as a consequence of this disaster that a powerful squadron was sent out by the British to search for Admiral Von Spee's fleet. On Dec. 9 the two squadrons came in sight of each other. On the German side were the cruisers "Gneisenau" and "Scharnhorst," and the light cruisers "Nürnberg," "Leipzig" and "Dresden." These vessels mounted 16 8.2-inch, 12 5.9-inch, 32 4.1-inch, 40 3.4-inch, and 12 2.1-inch guns. The contest was a brief one. Following it the British Admiralty announced that the "Scharnhorst," flying the flag of Admiral Count Von Spee, the "Gneisenau" and the "Leipzig" had been sunk. The "Dresden" and the "Nürnberg" made off during the action and were pursued. Two colliers were captured. The British casualties were few in number, and there were few German survivors from the foundered vessels. "Nürnberg" was speedily overtaken and sunk, but the "Dresden" roamed the seas for months and was finally sunk off Juan Fernandez on March 14, 1915. In the squadron of Rear-Admiral Sturdee were two battle cruisers, the "Invincible" and the "Inflexible," armed with 12-inch guns and capable of a speed of 28 knots, and three armored cruisers, the "Carnarvon," "Kent" and "Cornwall." These were supplemented by the "Glasgow," which had been in the previous engagement. The Germans had been brought to battle by a ruse. They had come expecting to find a single British warship, and were suddenly confronted by Sturdee's powerful squadron steaming out of a land-locked harbor. The ice-cold water is given among the causes that prevented the rescue of survivors, just as the victors in the battle off the coast of Chile had been prevented by the heavy seas to save the defeated crews. It is stated also that many while in the water were attacked by the albatrosses which picked at their eyes. As a result of the struggle with the vultures the weakened members of the crew slipped off the débris and were lost.

FALKNER, ROLAND POST, an American statistician; born in Bridgeport, Conn., April 14, 1866; was graduated at the University of Pennsylvania in 1885; studied economics at Berlin, Leipzig, and Halle-on-Saale, Germany; was instructor in accounting and statistics in the University of Pennsylvania in 1888-1891, and Professor of Statistics in 1891-1900. He served also as statistician of the United States Senate Committee of Finance in 1891; as secretary of the United States Delegation to the

International Monetary Conference; and as secretary of the conference in 1892. He was a member of the American Economic Association, the American Statistical Association, and the American Academy of Political and Social Science; author of numerous essays on criminology, sociology, etc.; chief of the division of documents in the Library of Congress, and editor of "Annals" of the American Academy of Political and Social Science (1890-1900). Commissioner of education, Porto Rico (1904-1907), Statistician U. S. Immigrant Commission (1908-1911), Assistant Director of Census (1911-1912).

FALL, ALBERT BACON, a United States senator from New Mexico, born in Frankfort, Ky., in 1861. He was educated in the country schools. After reading law, he was admitted to the bar and began practice in 1889, continuing until 1904. He worked as a miner and became interested in mines, lumber, lands, and railroads, acquiring large interests in farming, stock raising, and mining. He served as a member of the New Mexico Legislature and as associate justice of the Supreme Court of New Mexico. He was elected to the United States Senate in 1912 and was again elected in 1913 for the term of 1913-1919. He was re-elected in 1919. In the Senate he gave special attention to the relations of the United States and Mexico, and in 1918-1920 he conducted a series of investigations relating to Mexico and the border States, Arizona and New Mexico. He became Secretary of the Interior on March 4, 1921.

FALL, THE, a term used of the first sin of Adam, and hence often called "the fall of Adam," with which "original sin" his posterity are held to have had mysteriously to do; on which account we often meet with the term "the fall of man." The verb "to fall" is often used in a generic sense in Scripture for a lapse into sin (Ezek. xliv: 12, Rom. xiv: 13, I Cor. x: 12, Rev. ii: 5. The substantive is not used equivocally in the same sense. "The Fall" is therefore a theological rather than a scriptural term. According to the Biblical narration, God created man in His own image (Gen. i: 27), like the rest of creation "very good" (i: 31). In the midst of the garden of Eden, in which the first parents of our race were placed, was the Tree of the Knowledge of Good and Evil. This they were forbidden to eat on pain of death, all other trees being freely granted them for food (ii: 16-17). Beguiled by the serpent, Eve first yielded, and then, at her persuasion, Adam ate the forbidden fruit (Gen. iii: 1-6); after this they feared to continue communion with God (8-10), had sentence pronounced against them (16-19), and were expelled from the blissful garden (24). In the New Testament it is indirectly hinted that the devil used the serpent as a mouthpiece, whence he is called "that old serpent . . . which deceiveth the whole world" (Rev. xii: 9), and "the dragon that old serpent" (xx: 2), and is said by our Lord to have been "a murderer from the beginning" (John viii: 44).

FALLIÈRES, ARMAND, 8th President of the French Republic. He was born at Mézin, Lot-et-Garonne, in 1841, and after his preliminary education took up the study of law. His first prominent public position was as mayor of



ARMAND FALLIÈRES

Nérac, following on which he was in 1876 elected as member of the Chamber of Deputies, where he sat with the republicans. His career in the chamber showed him to be possessed of much solid talent, and in 1880 he was appointed to act as Undersecretary in the Ministry of the Interior, holding that position during the Ferry administration till the beginning of 1882. After an interval he became, toward the end of the same year, head of the department under Duclerc, becoming in 1883 Minister of Public Instruction in the Ferry administration. When in 1887 Rouvier succeeded, he became Minister of the Interior, and was later (1887-1889) Minister of Justice and Public Instruction under Tirard, holding that position later under Freycinet, who was head of the administration from 1890 to 1892. In 1890 Fal-

lières entered the Senate and gained much distinction in that chamber. In 1899 he was elected President of the Chamber, being re-elected eight times in succession. In the elections of 1906 he was put forward by the Socialists and Republicans as their candidate for President to succeed Loubet, easily winning over Doumer, who had the support of the Conservative elements. In January of the same year he was elected by the National Assembly by 449 votes to 371, assuming office as President in February. He held the office till succeeded by M. Poincaré in 1913. As President he gave support to the same principles and tendencies that had secured his adhesion during his public life, favoring the radical elements, and opposing the royalists and conservatives. The first year of his presidency was signalized by much public excitement, due to the resistance of religious associations to conform their organization to certain rules issued by the Government, which as a result compelled the evacuation of many churches, convents, and monasteries. In 1909 Fallières, in conjunction with the Cabinet, formed a separate Ministry of Labor.

FALLING STARS. See METEOR.

FALLOPIAN TUBES, two ducts or canals floating in the abdomen, and extending from the upper angles of the womb to the pelvis. They were popularly but incorrectly believed to have been discovered by Fallopius.

FALLOW DEER (*Dama vulgaris*), an animal of the deer kind, well known from being preserved in a semi-domesticated state in many English parks. The color of the wild animal, both buck and doe, is a rich yellowish brown in summer, spotted with white all over. In winter the tints are more somber and grayish. Domestic varieties vary greatly both in the distinctness of the spotting and the general coloration. The antlers are palmated in the upper parts, in the region of the sur-royals, the digitations or terminal points being developed along the convex posterior margin of the palmated surface. Till six years of age the buck receives a distinct name each year from sportsmen — viz., fawn, pricket, sorrel, soare, buck of the first head, and buck complete; the antlers not being developed at all in the fawn, being simple snags in the pricket, with two front branches in the sorrel, with slight palmation of the extremity of the beam in the soare, and the whole antler larger and larger until the sixth year. It is a native of northern Europe.

FALLOWS, SAMUEL, an American clergyman; born in Pendleton, Lancashire, England, Dec. 13, 1835; was graduated at the University of Wisconsin in 1859; vice-president of Galesville University in 1859-1861; minister of the Methodist Episcopal Church in 1859-1875, and later of the Reformed Episcopal Church. He served with distinction in the Civil War. Subsequently he preached at Milwaukee; was State Superintendent of Public Instruction in Wisconsin in 1871-1874; regent of the University of Wisconsin in 1866-1874; and president of Wesleyan University in 1874-1875. He became rector of St. Paul's Reformed Episcopal Church in Chicago in 1875, and bishop in 1876; was president of the Illinois State Reformatory; chairman-general of the Educational Committee of the World's Congresses; chancellor of the University Association. Chaplain-in-chief of G. A. R., 1907-1908. Patriotic instructor to the same, 1908-1909. Commander for Illinois of the Loyal Legion (1907). Department commander for Illinois of the G. A. R. (1914-1915). Author, "Life of Samuel Adams," "Students' Biblical Dictionary," "Past Noon," "Splendid Deeds," "Popular and Critical Biblical Encyclopedia" (1901); "Health and Happiness" (1908).

FALL RIVER, a city and port of entry of Bristol co., Mass., at the mouth of the Taunton river, where it empties into Mount Hope Bay, and on the New York, New Haven and Hartford railroad; 49 miles S. of Boston. It is connected with New York City by steamers, and has a fine harbor capable of admitting the largest vessels. The stream called Fall River is the outlet of Watuppa lake, and has a fall of 129 feet in less than half a mile, affording excellent water power.

Public Interests.—The city is built on high ground and covers an area of 42 square miles. The streets are well laid out and contain many handsome buildings, largely of granite, found in the vicinity. It is lighted by gas and electricity; has a waterworks system owned by the city, supplying 18,000,000 gallons daily from Lake Watuppa. Its educational institutions include the Durfee public high school, the Academy La Ste. Union des Sacrés Cœurs, Notre Dame College, Fall River Conservatory of Music, and a civil service school. There are also a public library, several circulating libraries, a State armory, and 50 churches, daily and weekly newspapers, and electric street railways connecting with neighboring towns.

Business Interests.—Fall River is the largest cotton-milling city in the United States. The city has cotton goods estab-

fishments employing 40,000 persons and over $40,000,000 capital. Other important manufactures are machines and machinery, food preparations, clothing, woolen goods, metals and metallic goods, drugs and medicines, paints and dyes, cordage and twine, and clocks, watches, and jewelry, boots and shoes, brass products, rubber, sash, etc. In 1919 there were 4 National banks. The exchanges at the United States clearing-house during the year ending Sept. 30, 1919, aggregated $108,228,000.

History.—The city was originally a part of Freetown, but was incorporated separately in 1803. Later it was called Troy, but its first name was restored in 1834. The city charter was granted in 1854 and in 1862 Fall River in Newport co., R. I., was annexed. Pop. (1910) 119,295; (1920) 120,485.

FALLS, DE WITT CLINTON, an American artist, soldier and writer, born in New York City in 1864. He was educated in private schools. He served during the Spanish-American War and on the Mexican border. In 1917 he was appointed colonel of the 7th Infantry of the New York Guard. In the following year he became major in the United States Army and was assigned inspector of the General Staff. He was promoted to be colonel and was honorably discharged in 1919. Prior to his discharge from the American Army he acted as observer in the Russian Army during the Russo-Japanese War. During the World War he engaged in special duty at the American Embassy in London. He was a member of many patriotic societies. He wrote "A. B. C. of Golf" (1897); "The Journey Book" (1910); "Mobilization of the Armies of Belgium and England" (1914); "Army and Navy Information Book" (1917). He was the illustrator of a number of books.

FALMOUTH, a town in Barnstable co., Mass.; on Buzzards Bay, Vineyard Sound, and on the New York, New Haven and Hartford railroad, at the extreme W. end of Cape Cod; 50 miles S. E. of Boston. It is the center of an agricultural and cranberry region. It is best known as containing the WOODS HOLE (*q. v.*) Station of the United States Fish Commission.

FALMOUTH, a seaport town of England, Cornwall county, at the mouth of the Fal river, 11 miles from Truro. It has a good harbor, and a fine and spacious roadstead. There are two castles on the coast, one of which, Pendennis, commands the entrance of the harbor; and the other, on the opposite side, is St. Mawes Castle. The town is chiefly important as a station of the boats carrying foreign mails. The scenery of the Fal, from Truro to Falmouth, is of great beauty. Pop. about 12,000.

FALSE DEMETRIUS, THE. See DEMETRIUS.

FALSTER, one of the Danish islands in the Baltic, separated by narrow straits from Zealand on the N., Moen on the N. E., and Laaland on the W.; length, N. to S., 27 miles; breadth, varying from 3 to 14 miles; area, 194 square miles; surface, almost entirely flat. Falster is the pleasantest of all the Danish islands, is well watered, richly wooded, and so prolific in fruit that it has been called the "orchard of Denmark." Products, corn, hemp, hops, cattle, honey, wax, etc. Some shipbuilding is carried on. Capital, Nykjöbing. Pop. about 40,000.

FAMAGUSTA (fa-ma-goos'ta), a seaport town of the island of Cyprus, 40 miles E. of Nicosia. Famagusta is built on the ruins of the ancient Arsinoë, and during the Venetian régime it was one of the richest and most populous towns in the Levant. It is now almost in ruins, with its once fine harbor almost choked up with sand, having declined since its conquest by the Turks in 1571. About 5 miles N. E. are the ruins of Constantia, occupying the site of the ancient Salamis, now called Eski, or Old Famagusta. Guy de Lusignan was here crowned King of Cyprus in 1191.

FAMILY, a household, including parents, children, and servants; the collective body of persons who reside under one roof, and under one head, or manager; those who descend from one common ancestor; a tribe or race; kindred; as, the human family; lineage; line of ancestors. Among the Romans, *familia* was applied to all persons in the power of a *paterfamilias*—as his sons, daughters, grandchildren and slaves; but it was also used in a wider sense, including all objects of property, even inanimate. The family is the cornerstone of the social edifice. Hence, it has been taken as a model for forming other associations—political, civil, or religious. Among the early Hebrews, and in Eastern countries, the patriarchal form of government is only an extension of the family relationship. The Greeks regarded the family as a type of the state; and among the Romans the natural power of a father was taken as the basis of the whole social and political organization of the people. The family life is based upon the wants and necessi-

ties of our nature, and is essentially fitted to develop and foster those habits and affections on which the happiness and welfare of mankind depend. It can, however, exist in a state of purity only where monogamy prevails.

In botany, a synonym for ORDER (*q. v.*). In zoölogy, the group above the genus. An order of animals should be divided into families according to the form of species, but, in fact, the greatest confusion reigns in the classification of the animal kingdom.

FAMINE, a scarcity of food over large areas, resulting in suffering or death by starvation and disease to multitudes. Short crops are caused by drought, excess of rainfall, severe and untimely frosts, the ravages of insects and vermin, the devastation of war, wholesale destruction of forests, diseases of plants, etc.

The Greek republics enacted very strenuous laws regarding the trade in grain; and the Romans, even at the time of their greatest prosperity, were so dependent on Egypt and Sicily for their breadstuffs, that even a brief delay in the arrival of the ships caused local famines. In the Middle Ages famines were of frequent occurrence and were often accompanied by frightful social phenomena. The famine of 1125 diminished the population of Germany one-half. All through the Middle Ages public opinion upheld the city authorities in driving out of the gates the neediest inhabitants and letting them perish. In a famine which devastated Hungary in 1505 parents who killed and ate their children were not punished. As late as the middle of the 17th century famines were a common affliction in Europe and even in the 18th century they still occurred. The last time a period of bad harvests was designated as a famine in Germany was in 1817.

During and in the year following the World War (1914-1918), there were many deaths from famine in Europe, but it is inconceivable at the present time that a general famine should devastate western or central Europe or the Americas. In India and other parts of Asia the situation is different. In India, where there are eight months of dry weather and the crops depend on the rainfall of four months and subsequent irrigation, if there is any lack in the monsoon, famine is almost sure to follow. Under the rule of the English, too, the population has greatly increased, and, while the majority of people live from hand to mouth in ordinary times, the slightest failure in the rice crop causes the famine point to be immediately reached. The recent famine in India cost the government in 1900-1901 $28,235,000. Apart from this $13,700,000 was advanced to native states for famine relief and $4,735,000 for special agricultural advances. In 1870-1872 Persia lost 1,500,000 inhabitants, a quarter of the whole population. In the N. provinces or China, Shensi, Shansi, and Honan, with a population of 56,000,000, during the years following 1877 it was reckoned that between 4,000,000 and 6,000,000 people perished. In the famine of 1891-1892 in Russia it was estimated that in 18 provinces 27,000,000 inhabitants were affected.

In the summer of 1920, a famine in China caused thousands of deaths.

FANATIC, a person affected by excessive zeal and enthusiasm, especially on religious subjects; one laboring under wild and extravagant notions of religion; an enthusiast; a visionary.

In ancient Rome the term was applied to such as passed their time in temples, and who, pretending to be inspired by the divinity, would burst into wild and frantic gestures, utter pretended prophecies, cut themselves with knives, etc. Hence, the term has in modern times come to be applied to such as manifest a religious enthusiasm, uncontrolled by reason or experience. Fanaticism is sometimes applied in a wider sense to any excessive prepossession of the mind by ideas of any kind. It has prevailed under different forms in all ages of the world; and one of its most remarkable and dangerous features is the tendency that it has to spread over large masses of a people. The very earnestness of the fanatic serves to carry conviction to the minds of others. Among persons of this class were Madame Guyon, Joanna Southcott, and numerous others.

FAN CORAL, in zoölogy, the name of the genus *Rhipidogorgia*, belonging to the family *Gorgonidæ*.

FANDANGO, a lively Spanish dance in triple time, derived from the Moors. It is danced by two persons, male and female, and accompanied by the sounds of the guitar. The dancers have castanets which they beat in time to the measure, though sometimes the male dancer beats a tambourine. Also the accompaniment of this dance.

FANEUIL, PETER, an American merchant; born in New Rochelle, N. Y., in 1700; settled in Boston, Mass., where he became a successful merchant. In 1740 he built a market house at his personal expense as a gift to the town. During the Revolutionary War this building was often used as a meeting

place by the patriots. Owing to the many stirring debates that occurred here, the hall received the name of "the Cradle of American Liberty." Faneuil died in Boston, Mass., March 3, 1743. See FANEUIL HALL.

FANEUIL HALL, a public hall in Boston, presented to the town by Peter Faneuil, in 1740. In 1761 it was destroyed by fire. In 1763 it was rebuilt by the town; and, in 1775, during the British occupation of Boston, it was used for a theater. It is an edifice about 80 feet square; the hall contains some fine paintings; and the basement is still used as a market. See FANEUIL, PETER.

FANNING ISLANDS, a group of islands in the Pacific Ocean, lying between longitude 157° and 163° West. The group has an area of about 260 square miles. The chief islands are Christmas, Fanning, Jarvis, Washington, and Palmyra. They have been the property of Great Britain since 1888. Pop. about 200.

FANO (ancient Fanum Fortunæ, from a temple dedicated to the goddess Fortuna); a well-built town and seaport of central Italy, province of Urbino, 7 miles S. E. of Pesaro, and 29 N. W. by W. of Ancona. Manufactures silk stuffs, twists, etc. Pop. about 12,000.

FANTAIL, in zoölogy, a genus of Australian birds (*Rhipidura*) belonging to the family *Muscicapidæ*. They derive their name from the fan-like shape of their tails. Also a variety of the domestic pigeon. In gas lighting a form of gas burner, in which the burning jet has an arched form. In carpentry, a kind of joint.

Fantail warbler; in ornithology, *Cisticola cursitans*, a very tiny bird, somewhat like a diminutive lark. It is a native of southern Europe, Africa, India, and China.

FANTASIA, in music, a species of composition in which the author confines himself to no particular form or theme, but ranges as his fancy leads amid various airs and movements.

FANTIS, a negro people on the Gold Coast of Africa. They were once the most numerous and powerful people on the Gold Coast. In 1873 they were attacked by the Ashantees who after a considerable struggle were conquered by British forces. Ashantee became a British protectorate in 1896, and was annexed in 1901.

FARAD (from Michael Faraday, the great electrician), the standard electrical unit, which is measured by the capacity of a condenser, that with an electromotive force of one volt is able to overcome a resistance equivalent to one ohm in one second, or in other words, the resistance offered by a cylindrical copper wire 250 feet long, 1-20 inch in diameter, the ohm being the magneto-electric unit.

FARADAY, MICHAEL, an English scientist; born in Newington Butts, England, Sept. 22, 1791. He received little or no education and was apprenticed to the trade of a bookbinder. During his term of apprenticeship, a few scientific works fell into his hands, and he devoted himself to the study of, and experiments in, electricity. Having attended the lectures given in 1812 by Sir Humphry Davy, and taken notes thereon, he sent them to that great philosopher, and besought some scientific occupation. The reply was prompt and favorable. In 1813 Faraday was appointed chemical assistant, under Sir Humphry, at the Royal Institution. After a continental tour in company with his patron, Faraday, still pursuing his scientific investigations, discovered, in 1820, the chlorides of carbon, and, in the following year, the mutual rotation of a magnetic pole and an electric current. These discoveries led to the condensation of gases in 1823. In 1829 he labored on the production of optical glass; but though unsuccessful in his immediate object, his experiments produced the heavy glass which afterward proved of great assistance to him in his magnetical investigations. In 1831 the series of "Experimental Researches in Electricity," published in the "Philosophical Transactions," began with the development of the induction of electric currents, and the evolution of electricity from magnetism. Three years later Faraday established the principle of definite electrolytic action, and in 1846 received at the same time the Royal and the Rumford medals for his discoveries of diamagnetism, and of the influence of magnetism upon light respectively. In 1847 he discovered the magnetic character of oxygen, and, also, the magnetic relations of flame and gases. His papers, including other contributions to the store of modern science, are too numerous to mention in detail. In 1833 Faraday was appointed Professor of Chemistry in the Royal Institution, London, which chair he continued to hold until his death. In 1835 he received from government a pension of $1,500 per annum in recognition of his eminent scientific merits. In 1836 he was appointed a member of the senate of London University. From 1829 to 1842 he was chemical lecturer at the Royal Academy. In 1823 Faraday was elected corresponding member of the French Academy, in 1825 he was chosen

a Fellow of the Royal Society, and in 1832 made a D. C. L. of Oxford University. He was, besides, a knight of several of the European orders, and a member of the chief learned and scientific societies in Europe and the United States. He died in Hampton Court, Aug. 25, 1867.

FAR EASTERN QUESTION, that problem of international politics which has to do with the maintenance of the equilibrium of the various national spheres of influence in the Far East, especially in China. China, and formerly Japan, have been nations whose commercial importance has been out of all proportion to their political and military power. The consequence has been that there has been a keen rivalry among the Western nations for commercial influence in the Orient, resulting in a pressure of special privileges which the military impotence of China made her unable to resist. Until the World War this rivalry for trade privileges existed between Great Britain, France, Russia, Germany, and the United States. A partial solution to the problem thus raised was found in an agreement whereby the Orient was divided into "spheres of influence," the territory involved being apportioned out among the rivals, each to have a dominant interest in its own sphere. The exception has been the United States, whose Government has stood for an equal opportunity in the markets of China for all.

These spheres of influence were recognized as follows: the Yang-tse Valley and Tibet for Great Britain; Mongolia and Manchuria for Russia; Indo-China for France, and Kiauchau and the Shantung Peninsula for Germany. Since her emergence into the concert of nations as a military and naval power to be reckoned with, Japan has also been granted recognition, and has had Korea assigned to her as her sphere of influence.

These influences progressed rapidly, to the point where they amounted to at least partial military occupation, as in the case of Kiauchau by Germany, Korea by Japan, Manchuria by Russia, and Hong-Kong by Great Britain. Inevitably the final result would have been the complete partitioning of China among the rivals, had it not been for the consistent opposition of the United States to such a conclusion.

As first enunciated by Anson Burlingame, in 1868, the United States was unalterably opposed to any further undermining of the "right of eminent domain" by China herself. This policy was further elaborated into the "open door" policy by John Hay, after the Boxer troubles, in 1900, which the rival nations made the pretext of a military occupation of the Chinese capital itself. During 1912-1914 President Wilson still further voiced this policy by declaring that the Powers involved must keep "hands off" China, and respect her national entity.

Since the World War the superficial aspect of the problem has been somewhat changed by the elimination of Germany and Russia as factors. Kiauchau and the Shantung Peninsula, the German "sphere," were occupied by Japan, as one of the allies opposing Germany, with the declared intention of returning these territories to the Chinese administration. This promise Japan had not, in 1920, fulfilled. The Russian Soviet Government, in September, 1920, voluntarily relinquished the Russian treaty rights in China.

FARGO, a city and county-seat of Cass co., N. D.; on the Red river, and on the Chicago, Milwaukee and St. Paul, the Northern Pacific, and the Great Northern railroads; opposite Moorhead, Minn. Here are a United States land office, Fargo College (Cong.), the State Agricultural and Mechanical College, high school, court house, waterworks, street railroad and electric light plants, several banks, hospitals, parks, and a number of daily and weekly newspapers. It has the car shops of the Northern Pacific railroad, flour, planing and paper mills, large grain elevators, knitting mills, bottling works, and large brick yards. Pop. (1910) 14,331; (1920) 21,961.

FARGO COLLEGE, a coeducational institution in Fargo, N. D.; founded in 1888 under the auspices of the Congregational Church; reported at the close of 1919: Professors and instructors, 32; students, 602. President, W. H. Howard.

FARGO, WILLIAM GEORGE, an American capitalist; born in Pompey, N. Y., May 20, 1818; became Buffalo agent of the Pomeroy Express Company in 1843; established the first express company W. of Buffalo, in 1844; and, in 1868, became president of the great corporation controlling the whole West, the Wells Fargo Express Company. He died in Buffalo, N. Y., Aug. 3, 1881.

FARIBAULT, a city and county-seat of Rice co., Minn.; at the confluence of the Cannon and Straight rivers, and on the Chicago Great Western, the Chicago, Rock Island and Pacific and the Chicago, Milwaukee and St. Paul railroads; 53 miles S. of St. Paul. Here are a court house, city hall, public library, the Shat-

tuck Military School, the Seabury Divinity School, the State Schools for the Deaf, Blind, and Imbeciles, Bethlehem Academy for Girls, St. Mary's School for Girls, gas and electric lights and weekly and monthly periodicals. It has manufactories of pianos, carriages, furniture, boiler works, foundry products, rattan goods, and gasoline engines, and canning establishments, flour, planing and woolen mills. Pop. (1910) 9,001; (1920) 11,089.

FARLEY, JOHN MURPHY, CARDINAL, an American prelate. He was born at Newton Hamilton, Armagh, Ireland, in 1842, and received his preliminary education in his native place. Coming to the United States in early youth he became a student at St. John's College, Fordham, and at St. Joseph's Seminary, Troy, and then was transferred to the American College at Rome. He was ordained priest in Rome in 1870 and took charge of a parish in Staten Island for two years. After acting as secretary to Cardinal McCloskey he was chosen rector of the American College at Rome, but was retained in New York and given the appointment of private chamberlain. In 1891 he became vicar-general of the archdiocese of New York, and in 1895 prothonotary apostolic. He was then made assistant bishop, and in 1902 succeeded as archbishop of New York. In 1911 he journeyed to Rome to be made cardinal and on his return to New York was given a great popular ovation. During the later as during the early years of his archiepiscopate he showed great energy in furthering the erection of churches, schools, orphanages, hospitals, and other institutions in the popular archdiocese. He died at Mamaroneck, N. Y., Sept. 17, 1918. He was an eloquent preacher and was a contributor to several magazines. He was author of a "Life of Cardinal McCloskey."



CARDINAL FARLEY

FARM, a tract or piece of land cultivated by a single person, whether owner or tenant; also a district farmed out for the collection of revenue; or the right or permission to sell certain articles subject to duties. Also a term formerly used in Cornish mining for the lord's fee, which is taken for liberty to work tin-bounds.

FARM MANAGEMENT, the problem of economics in agricultural production, with the object of introducing therein the same business efficiency which has brought American manufacturing to its present high degree of perfection. While the basis of manufacturing industry has been radically changed by the use of machinery and factory organization, thus becoming the subject of executive management, agricultural production has not undergone any such basic changes. Farming is still a one-man enterprise and is still largely carried on in the same way in which it was carried on when the handicrafts system of manufacturing obtained. It has been only partially affected by machinery, and that in only certain phases, as in the production of the grain crops, which are now harvested by machinery. Farming, therefore, still remains very much a home industry.

The rapid growth of the urban population, and its demands for farm-grown products, have made improved methods in agricultural production a national problem. For this reason the Federal Department of Agriculture and the various State agricultural departments have made efficiency in agricultural production one of their chief aims.

Minnesota, through its agricultural experiment station, in 1902, was the first State to raise the problem of farm management to the dignity of a special scientific study. Shortly after this subject also received the serious consideration of the Federal Department of Agriculture. Now it has been taken up by most of the other States, and every effort is made, through literature and practical demonstrations, to propagate among the farmers a knowledge of the results obtained from the experiments made by the demonstration farms established in all parts of the country.

Farm management involves many phases of practical farming; the proper rotation of crops, the comparative value of fertilizers; co-operative organization for the purpose of purchasing seeds and fertilizers, and for the sale of crops at a minimum of loss to profiteering middlemen, and, by no means least, a proper system of bookkeeping, whereby the individual farmer may know his profits and losses on his various transactions, so that the source of loss may be eliminated. All means to making farming profitable to farmers are considered a legitimate part of the general subject of farm management. The economy of gasoline-driven vehicles for carrying produce to market, or of dynamite in digging ditches for drainage, are fair illustrations of phases which are shown by actual demonstration. The main object is to eliminate waste and to introduce a scientific efficiency in every department of agricultural production. A fuller discussion of this subject will be found in "What is Farm Management?" Bulletin No. 259, issued by the Bureau of Plant Industry, Department of Agriculture, Washington, D. C.

FARMER, one who farms or contracts to collect taxes, imposts, duties, etc., for a certain payment per cent.; also one who farms or cultivates ground; an agriculturist; a husbandman.

FARMER - LABOR PARTY. — See UNITED STATES, POLITICAL HAPPENINGS.

FARMERS' ALLIANCE, a general term for an American association of agriculturists which was founded in 1873, originally in Texas, where it was organized for the purpose of co-operation against cattle thieves. In 1887 its members had increased to over 100,000, its scope was greatly extended, and it consolidated with the Farmers' Union of Louisiana, becoming incorporated under the laws of the District of Columbia, as the National Farmers' Alliance and Co-operative Union. In 1880 the National Agricultural Wheel was organized in Arkansas, and branches were formed in other States. These two organizations were consolidated at St. Louis, Mo., Oct. 1, 1889, under the name of the National Farmers' Alliance and Industrial Union, with a membership then estimated at from 1,600,000 to 2,500,000. This society is in active operation in all the Southern and Western States (except Ohio and Wyoming), and in New York, New Jersey, and Pennsylvania. Another organization, called the National Farmers' Alliance, was formed in Chicago in 1880. In 1892, fusing with others as the People's party, it nominated J. B. Weaver for President and cast 1,041,021 votes. The Southern branch seceded and went out of politics. The Farmers' National Alliance held a convention in 1914, when it claimed a membership of over 3,000,000. The Alliance advocated Federal assistance for inland commerce, a literacy test for immigrants, and a poll tax upon them.

FARMERS' INSTITUTE, an assembly of the farmers held to further their knowledge of agriculture or for their entertainment. The institute is derived from the earlier farmers' meetings which were held under the auspices of local agricultural societies.

When the Morrill Act of 1862, granting Federal aid to State universities, was passed, these meetings were patronized by the State and became distinctively educational in their character.

Custom differs in the various States as to the length of the meetings; some are held for only half a day, while other institutes last for several days. Usually they are held in the winter season, so as to afford the farmers full opportunity to attend. The State agricultural college commonly directs the activities of the institutes, and with the help of the local committee prepares their programs. These usually consist of addresses by specialists on some subject of interest to farmers, and is followed by questions and discussions from the body of the meetings. The United States Department of Agriculture has prepared valuable lantern slides for exhibition at these institutes, showing how to increase production on the farms and how best to combat plant diseases. Very frequently social features are introduced in the institute programs. It is estimated that more than four million persons a year attend these meetings, and their influence in improving agricultural methods has been incalculable.

FARMING, the business or management of a farm, comprising the entire circumstances and control of it. Once regarded as a profession easy to be understood, and requiring but little preparation for its successful practice, it has come to be viewed in a different and a wiser manner. It has been justly said that no pursuit requires more talent, perseverance, and careful observation than the cultivation of the earth; that, so far from its being an empirical business, it is, in fact, one that several other sciences illustrate and assist; one whose professors cannot too often examine the practice of other cultivators; and hence, since it has been found that the labors of the chemist, the botanist, the mechanist, and

the geologist, are all available in the service of the farmer, it has followed, as a natural consequence, that the farmers of our age are rapidly becoming a more scientific, more educated, and far more enlightened class than those of any previous generation. See AGRICULTURE.

FARNAM, HENRY WALCOTT, an American economist, born in New Haven, Conn., in 1853. He graduated from Yale in 1874 and took post-graduate studies at Berlin and other German universities. From 1878 to 1880 he was tutor and from 1880 to 1918 professor of economics in Yale University. In the latter year he was appointed professor emeritus. From 1892 to 1911 he was one of the editors of the "Yale Review," and of the "Economic Review" in 1911-1912. He served as chairman of the New Haven Civil Service Board and as president of the Connecticut Civil Service Reform Association. He was the author of a number of books on economic subjects, several of them written in the German language. He was a member of many economic societies.

FARNBOROUGH, a town in Hampshire, England. It is on the Blackwater, near the Basingstoke canal. Its most important industry is the raising of strawberries. It was long noted as the seat of Farnborough Hill, which was the residence of the former Empress Eugénie until her death in 1920. The main depot of the British Royal Aircraft factory was at Farnborough during the World War. Pop. about 15,000.

FARNESE, the patronymic of an illustrious and princely Italian house, which arose about the middle of the 13th century. Of its principal members were the following:

FARNESE, ALESSANDRO, Cardinal, raised to the tiara under the title of Pope Paul III., in 1534, who created his natural son, PIETRO, Duke of Parma and Piacenza.

FARNESE, ALESSANDRO, great-grandson of the preceding; was born 1546. He early entered upon the profession of arms, and distinguished himself at the battle of Lepanto (1571) under his uncle, the famous Don John of Austria. Philip II. afterward appointed him governor of the Netherlands, where he waged war against the Prince of Orange. He was subsequently made commander-in-chief of the army sent to the assistance of the French Catholics, and compelled Henry IV. to raise the siege of Paris; but, being ill-supported by the League, he was eventually obliged to succumb to his great adversary and died soon after in Arras, in 1592. The line continued until 1731, when it became extinct in the person of ANTONIO FARNESE, the prince of his house.

FARNSWORTH, CHARLES STEWART, an American soldier, born in Lycoming county, Pa., in 1862. He graduated from the United States Military Academy in 1887. In the same year he was appointed 2d lieutenant and rose through the grades, becoming colonel in 1917. In the same year he was appointed brigadier-general of the National Army, and in the following year was made major-general. He commanded the 37th Division of the American Expeditionary Force from May 22, 1918, to April 5, 1919, taking part in the St. Mihiel offensive and in the offensives of the Argonne-Meuse and in Belgium. In 1919 he was commander of Camp Bowie, Tex., and in the same year was commander of the Infantry School at Camp Benning, Ga.

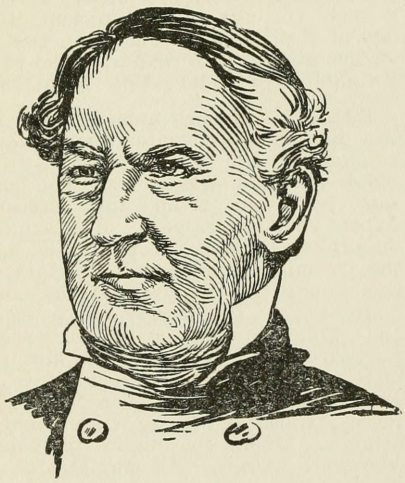
FARNWORTH, a town of Lancashire, England, on the Manchester and Bolton Railway. It has important manufactures of cotton, brick, tile, and iron. Within its limits are several mediæval buildings. Pop. about 35,000.

FARO, a game of cards, in which the player plays against the bank, which is kept by the proprietor of the table. It was introduced into France by the Venetian ambassador in 1674, in a form like bassette; but so many nobles were ruined by this game that Louis XIV. made a law against it. To elude this law it was called pour et contre, which gave rise to new prohibitions, to evade which the name Pharaoh was adopted. The game essentially consists in betting on which of two piles, into which the cards are alternately dealt, a certain card will fall. It is played with a "lay-out" of 13 cards, ranging from ace to king, inclusive, and a pack of 52 cards dealt from a box, one at a time, in two piles, alternately, as above said. There are various percentages, accruing to the dealer, the principal one being known as a split, which occurs when two cards of the same denomination follow in succession from the box, in which case the dealer takes half the sum bet by the player. When but two or three cards remain to be dealt, the player who succeeds in naming the order in which they will appear (or "calls the turn," as the gambler hath it) receives from two to four to one, according to the denomination of the cards, the amount being determined by the doctrine of chances.

FAROE ISLANDS, a group of 22 islands belonging to Denmark, in the Northern Ocean, between lat. 61° 15′ and 62° 21′ N., and lon. 6° and 8° E.;

about 185 miles N. W. of the Shetland Isles, and 320 S. E. of Iceland; area 530 square miles; pop. (1901) 15,230. The principal island, Stromoe, in the center, is 27 miles long by about 7 broad; the chief of the others are Osteroe, Vaagoe, Bordoe, Sandoe, and Suderoe. Only 17 of the islands are inhabited. Each of these islands is a lofty mountain rising out of the waves, and divided from the others by deep and rapid currents. The highest point, Skoelling, in Stromoe, has an altitude of 2,240 feet. Some of the group are deeply indented with deep and secure harbors; all are steep and most of them present, seaward, a succession of sheer precipices. Soil, thin, but tolerably fertile: barley is almost the only cereal grown. Products, hay in large quantities, salted mutton, tallow, feathers, eiderdown, etc. Manufactures, coarse woolen stuffs, and stockings. Vast quantities of sea-fowl haunt the rocks, the taking of which for the sake of their feathers affords a perilous employment to the inhabitants. Capital, Thorshavn, at the S. E. end of Stromoe. These islands are under the jurisdiction of a Danish governor, and have belonged to Denmark since the union of that kingdom with Norway in the 14th century.

FARRAGUT, DAVID GLASCOE, an American naval officer; born in Campbell's Station, Tenn., July 5, 1801. He was appointed, without previous training, a midshipman as early as 1810. Under Commodore Porter he was engaged in the "Essex" in her cruise against the British in 1812-1814, and after her capture he served on board the line-of-battle ship "Independence." Passing for a lieutenant, he was ordered to the West India station, and was appointed, in 1847, to the command of the "Saratoga" in which ship he took part in the naval operations during the Mexican War. When the Civil War broke out Farragut received the command of the Gulf squadron which was to co-operate with General Butler in the reduction of New Orleans, and engaged and passed the two strong forts of the Mississippi in April, 1862, which brought about the surrender of that city on the 28th of the same month. Natchez was taken in May, and Farragut's fleet ascended as far as Vicksburg, which place he bombarded till the fall of water compelled him to return to New Orleans. In 1862 he was the first officer to receive the rank of admiral in the United States navy; and in March, 1863, he passed the batteries of Port Hudson, and was in a few days again before Vicksburg, co-operating with General Grant in the reduction of that important stronghold. Having been ordered to attempt the capture of Mobile, he took the forts commanding the mouth of that harbor in August, 1864, with the loss, however, of one of his ironclads, the "Tecumseh," and its crew, by the explosion of a torpedo, and met with a repulse in an attack on Wilmington, Dec. 24-25. The place was, however, taken Jan. 15, 1865, and Mobile surrendered April 12, following. Admiral Farragut served in the United States navy for 60 years. In 1865 Farragut was appointed to the command of an American squadron dispatched on a cruise in European waters, from which he returned in 1868. He died in Portsmouth, N. H., Aug. 14, 1870.



ADMIRAL FARRAGUT

FARRAND, LIVINGSTON, an American educator, born in Newark, N. J., in 1867. He graduated from Princeton University in 1888, and from the College of Physicians and Surgeons in 1891. He carried on post-graduate studies in Cambridge, England, and in Berlin. He was on the faculty of Columbia University as professor of psychology and anthropology, from 1893 to 1914. In the latter year he was appointed president of the University of Colorado, serving until March 1, 1919, when he became chairman of the Central Committee of the American Red Cross. He was director of tuberculosis work in France for the International Health Board in 1917-1918. He was a member of many American societies and was the author of "Basis of American History" (1904). He contributed to psychological and anthropological publications.

FARRAND, MAX, an American educator, born in Newark, N. J., in 1869.

He graduated from Princeton University in 1892 and took post-graduate studies at that University and in Germany. From 1896 to 1901 he was instructor and professor of history of Wesleyan University, and from 1901 to 1908 he was professor and head of the department of history at Leland Stanford University. He was acting professor of Cornell in 1905-1906, and from 1908 was professor of Yale. In 1919-1920 he acted as general director of the Commonwealth Fund of New York City. He wrote "Legislation of Congress for the Government of the Organized Territories of the United States" (1896); "Framing of the Constitution" (1913); "Development of the United States" (1918); "Fathers of the Constitution" (1920). He was a frequent contributor to historical magazines.

FARRAR, FREDERICK WILLIAM, an English clergyman, dean of Canterbury; born in Bombay, India, Aug. 7, 1831. He was educated at University of London and Trinity College, Cambridge. He was ordained a deacon in 1854 and priest in 1857. He was assistant master at Harrow and head master at Marlborough College. He was made archdeacon of Westminster in 1883; and chaplain to the queen. He wrote these novels: "Eric, etc." (1858); "Julian Home" (1859); "St. Winifred's, etc." (1863). Of his religious and theological writings the most notable are: "The Witness of History to Christ" (1871); "The Life of Christ" (1874); "Life and Works of St. Paul" (1879); "The Early Days of Christianity" (1882); "Eternal Hope," "The Life of Lives" (1899), etc. He was author also of works on language, as "The Origin of Language" (1860); "Families of Speech" (1870); "Language and Languages" (1878); and handbooks on Greek grammar. He died in London, March 22, 1903.

FARS, or **FARSISTAN** (anciently Persis), a province of Persia, bordering on the Persian Gulf; rises from the steep coast in a succession of broad terraces. Area, about 53,500 square miles; the population, the exact number of which is not known, is very sparse. The coast zone or "hot country," the productiveness of which is greatly dependent on the rainfall, is backed by the "land of the passes," behind which comes the "cold country"; the interior belongs to the Iranian plateau. The mountain chains, lying parallel to the coast, embrace numerous fertile valleys, rich in pasturage and vines and fruit trees. Among the mountains are several lakes, the largest Lake Bakhtegan. The rivers are small. The climate varies with the different districts. The principal products of the province are fruits, dates, tobacco, cotton, silk, and excellent wine. The capital of Fars is Shiraz, pop. 25,000 to 30,000. The port, Bushire, on the Persian Gulf.

FARSAN ISLANDS, a group of islands in the Red Sea, about 35 miles off the W. coast of Yemen. They include the two larger islands of Farsan Seghir, 18 miles in length, and Farsan-el-Kebir, 25 miles in length. The islands are important chiefly for the pearl and coral fisheries. Dates and other fruit are also grown there. Prior to the World War Germany maintained a coaling station on one of these islands.

FARUKHABAD, a city of the Northwest provinces of India; near the Ganges; 83 miles N. W. of Cawnpur. It is a clean and healthy place, with a considerable trade, and a population (1901) of 67,338. The district of Farukhabad belongs to the alluvial plain of the Doab, the soil being for the most part high-lying, sandy, and infertile; area, 1,719 square miles; pop. about 1,000,000. The most important crops are potatoes, indigo, and sugar-cane. The capital is Fatehgarh. The ruins of Kanauj, the capital of a powerful Hindu kingdom, still exist within the district.

FASANO, a city in southern Italy. It is near the site of the ancient Roman city of Egnatia. It contains a city hall, which was the former palace of the Knights of St. John. Pop. about 20,000.

FASCES, the most ancient insignia of the Roman magistrates, consisting of bundles of elm or birch rods, in the center of which was an ax. The custom was borrowed from the Etruscans. After the banishment of Tarquinius Superbus, the fasces were carried before the consuls by men called lictors; but this honor was granted to the consul-major only. The consul and pro-consul had 12 lictors, each of whom carried a fasces; the dictator had 24, and when in Rome the ax was carried before him. The prætors of the towns had only 2 fasces; those of the provinces and the army 6. Under the empire the consuls, who were merely civil magistrates, had 12 fasces, while the pro-prætors and pro-consuls were allowed 6, and this lasted till the fall of Rome.

FASCIA, a bandage employed in various ways, as: (1) A diadem, formerly worn round the head as an emblem of royalty, the color being white; that worn by women was purple.

(2) Formerly as a support to the breast by women.

(3) Formerly as a bandage round the legs, especially of women, from the ankle to the knee, serving as a protection or a support to the legs of the wearer, a practice that was adopted in Europe in the Middle Ages.

(4) As a bandage for enswathing the bodies of infants, as practiced by the modern peasants of Italy.

In anatomy, a thin, tendon-like covering surrounding the muscles of the limbs, and binding them in their places; a tendinous expansion or aponeurosis. The fasciæ are named from (1) the position, as the anal and lumbar fasciæ; (2) from some peculiar function, as the cremasteric; or (3) from some peculiarity, as the cribriform fascia. In architecture, a flat architectural member in an entablature or elsewhere; a band or broad fillet. The architrave in the more elegant orders of architecture is divided into three bands, which are called fasciæ; the lowest being called the first fascia, the middle one the second, and the upper one the third. When there are only two fasciæ, they are called the upper and the lower. The term is also applied to the board or strip over a shop front, on which the name, etc., of the owner or occupier is written. In astronomy, formerly the belt of a planet. In entomology, a broad, transverse band. In surgery, a bandage, roller, or ligature.

FASCINE, in fortification, a cylindrical bundle of faggots or brushwood used in revetments of earthworks. When the limbs are stouter and longer than usual, it is called a saucisse or saucisson. In civil engineering fascines are used in making sea and river walls to protect shores subject to washing; or to collect sand, silt, and mud to raise the bottom and gradually form an island, either as a breakwater against inroads, or for purposes of cultivation, as in Holland.

FAST, total or partial abstinence from or deprivation of food; an omission to take food. Also a time set apart to express national grief for some calamity, or to deprecate an impending evil.

Ethnic Fasts.—The old Egyptians, the Assyrians (Jonah iii: 5), the Greeks, Romans, and other ancient nations had most of them stated or occasional fasts, as have the modern Mohammedans, Hindus, etc.

Jewish Fasts.—The Day of Atonement was the only fasting day enjoined by the law of Moses, but the Mishna speaks of four others, respectively commemorating the storming of Jerusalem by Nebuchadnezzar, the burning of the Temple by Titus, the sack of Jerusalem by Nebuchadnezzar, and the receiving by Ezekiel and the other captives of the news of the destruction of Jerusalem. There were also fasts proclaimed by royal or other authority on special occasions (I Kings xxi: 9-12; II Chron. xx: 3; Ezra viii: 2). For the spiritual and unspiritual way of keeping a fast, see Isaiah lviii: 3.

Christian Fasts.—No stated fasts are enjoined in the New Testament; they arose subsequently, the Lent fast taking the lead (see LENT). In the 3d century the Latins fasted on the seventh day. In A. D. 813 the Council of Mentz in its 34th canon ordered a fast the first week in March, the second week in June, the third week in September, and the last full week preceding Christmas eve. In the Episcopalian and Roman Catholic Churches the principal fasts of the year are Lent, the Ember days, All-Saints, the Immaculate Conception, Rogation days, and the eves or vigils before certain festivals; as before Christmas day. Some of these fasts are common to both Churches.

Modern Fasts.—Several times in the course of political events have different Christian governments proclaimed days of fasting and prayer. As a notable antitype of this custom may be mentioned the American National Thanksgiving, in which feasting and not fasting is the salient feature. See also FASTING.

FASTI. Numa Pompilius (715 B. C. to 673 B. C.), instituted the custom of marking monthly records of the feasts, games, etc., observed at Rome, on tables of stone. These, preserved by the priests, became the calendar by which the course of public business and of justice was regulated. C. Flavius copied these fasti, 306 B. C., and exhibited them in the Forum; and they subsequently became a kind of abridged annals, recording the names of public magistrates and the most important political events.

FASTING, in ordinary language, the act or state of abstaining partially or entirely from food. In medicine, loss of appetite without any other apparent affection of the stomach; so that the system can sustain almost total abstinence for a long time without fainting. For a number of years a lively discussion has been carried on as to the length of time a human being could exist while voluntarily fasting. Dr. Tanner, in New York City, fasted for 40 days without any ill-effects, and his fast found several imitators. Nothing of scientific value resulted from the experiment. Terence McSwiney, Lord-Mayor of Cork, Ireland, refused

food while in prison, and died on the 63d day of his fast, in October, 1920. Other Irish prisoners carried on a food strike for over fifty days and several of them died. See IRELAND.

Among the Ethnic Nations.—Its chief object was to produce religious exaltation, with visions, dreams, and imagined intercourse with superior beings. Fasting exists for this purpose among the North American Indians and many other tribes. Dreams, visions, etc., thus produced are not supernatural, but morbid.

Among the Jews.—It was practiced in seasons of affliction, nature having in a manner prescribed this by taking hunger away during keen sorrow (I Sam. xxxi: 13; Esther iv.); to chasten or humble the soul (Psalm xxxv: 13; lxix: 10).

Among Christians. — Jesus miraculously fasted 40 days and nights (Matt. iv: 2; Luke iv: 2), as Moses and Elijah had done previously (Exod. xxxiv: 28; I Kings xix: 8), and as several Roman saints claim to have done since. The practice is not, however, formally enjoined in the New Testament, though our Lord indirectly sanctioned it (Matt. vi.: 16-18), as did St. Paul (I Cor. vii: 5). The apostles and the Church of which they constituted a part practiced it on specially solemn occasions (Acts xiii: 2; xiv: 23). In the Roman and Greek obedience, communion must be received fasting, except when administered by way of viaticum.

FAT, in anatomy, an animal substance of a more or less oily character deposited in vesicles in adipose tissue. It forms a considerable layer under the skin, is collected in large quantity around certain organs, as, for instance, the kidneys, fills up furrows on the surface of the heart, surrounds joints, and exists in large quantity in the marrow of bones. It gives to the surface of the human frame its smooth, rounded contour. In chemistry, fats are glycerides of acids belonging to the fatty or acetic series and of acids belonging to the acrylic series, being the ethers of the triatomic alcohol glycerine. They are insoluble in water, but soluble in ether. They vary in consistence from a thin oil (olive oil) to a hard, greasy substance (suet). When fats are boiled with any caustic alkali they are decomposed, and yield an alkaline salt of the fatty acid (see SOAP), and GLYCERINE (*q. v.*). In printing, copy which affords light work, as blank or short pages or lines. The fat is in the fire: All is confusion, or all has failed.

FATALISM, the doctrine that all things are ordered for men by the arbitrary decrees of God or the fixed laws of nature. In theology, it has given birth to theories of predestination, and in moral science to such systems as those of Spinoza and Hegel, and more recently to the philosophy of Herbert Spencer. It is carried out to its most pitilessly logical extreme among the Mohammedans, where everything that can happen is "kismet," *i. e.*, fated, or decreed by fate.

FATA MORGANA, a remarkable aërial phenomenon observed from the harbor of Messina and adjacent places, and supposed by the Sicilians to be the work of the fairy Morgana. Objects are reflected sometimes on the surface of the sea, and sometimes on a kind of aërial screen to 30 feet above it.

FATES, the Parcæ, or Destinies; the goddesses supposed to preside over the birth, life, and fortunes of men. They were three in number; Clotho held the spindle, Lachesis drew out the thread of man's destiny, and Atropos cut it off.

FATHERS, THE, a name applied to the early writers of the Christian Church —those writers who have given us accounts of the traditions, practices, etc., that prevailed in the early Church. The term is mostly confined to those who lived during the first six centuries of the Christian era, and no writer is dignified with the title of father who wrote later than the 12th century. They are frequently divided into the Greek and Latin fathers; and those who flourished before the Council of Nice, in 325, are called the ante-Nicene fathers. The chief fathers of the first six centuries were as follows: In the 1st century flourished Clement, Bishop of Rome, and Ignatius, Bishop of Antioch; in the 2d century we have Polycarp, Bishop of Smyrna, Justin Martyr, Hermias, Dionysius of Corinth, Hegesippus, Tatian, Athenagoras, Theophilus, Bishop of Antioch, Irenæas, Bishop of Lyons, Clement of Alexandria, and Tertullian; in the 3d century, Minucius Felix, Hippolytus, Origen, Cyprian, Dionysius, Bishop of Alexandria, Gregory (Thaumaturgus); in the 4th century, Arnobius, Lactantius, Eusebius, Julius Firmicus, Maternus, Hilary, Bishop of Poitiers, Athanasius, Basil, Ephraim the Syrian, Cyril of Jerusalem, Gregory of Nazianzen, Gregory of Nyssa, Ambrose, Archbishop of Milan, Epiphanus, Bishop of Salamis, Chrysostom, Bishop of Constantinople, Ruffin, Presbyter of Aquileia; in the 5th century, Jerome, Theodorus, Bishop of Mopsuestia, Augustine, Cyril of Alexandria, Vincent of Lerins, Isidore of Pelusium, Theodoret, Bishop of Cyrus in Syria, Leo I., surnamed the Great, Virgilius, Bishop of Thapsus; in the 6th century, Procopius of Gaza, Aretas, Gregory, Bishop of Tours, and Greg-

ory I., surnamed the Great, Bishop of Rome. The last of the fathers is Bernard of Clairvaux, who died about the middle of the 12th century.

Learned men and theologians differ very much in opinion as to the value that is to be attached to the writings of the fathers. By some they are looked on as nearly of equal authority with the sacred Scriptures themselves, and as the most excellent guides in the paths of piety and virtue. Others regard them as unworthy of the least attention. The right we believe lies between these two extremes; and while the Roman Catholics exalt too highly the opinions of the fathers, yet by Protestants generally they are too much disregarded. Their writings contain many sublime sentiments, judicious thoughts, and things naturally adapted to form a religious temper, and to excite pious and virtuous affections; on the other hand, they abound still more with precepts of an excessive and unreasonable austerity, with stoical and academical dictates, with vague and indeterminate notions, and, what is still worse, with decisions absolutely false and in manifest opposition to the character and commands of Christ. Of the character and doctrines of the primitive Church they are competent witnesses, and, living within a comparatively short period of the apostles, there are many things which they relate regarding apostolic times, which had come down to them by tradition, and which are therefore not to be altogether rejected.

FATIMIDES, or **FATIMITES** (named from Fatima, the daughter of Mohammed and wife of Ali, from whom the founder of the dynasty described in the definition professed to have sprung), a race of Mohammedan kings, whose founder, Abu Obeidallah (El Madhi), was born in A. D. 882, and began to reign in 910, making Mahadi, the ancient Aphrodisium, about 100 miles S. of Tunis, his capital. The place was called from the name Mahadi, or Director of the Faithful, which he had assumed. The dynasty there founded continued to reign till 1171, and produced in all 14 kings.

FAUCIT, HELEN (LADY MARTIN), an English actress; born in London, England, Oct. 11, 1819. She made her professional début as Julia in the "Hunchback" at Covent Garden in January, 1836. She was at once successful, took a leading part in Macready's Shakespearean revivals, in the first representation of Lytton's plays, and in Browning's "Blot in the Scutcheon" and "Strafford." As an interpreter of Shakespeare's heroines, Juliet, Rosalind, Portia, Beatrice, Imogen, Cordelia, and Lady Macbeth, she stood first among the actresses of her time. After her marriage to Theodore Martin, in 1851, she left the stage. In 1885 she published a volume of delightful studies, entitled "On Some of Shakespeare's Female Characters." She died in Wales, Oct. 31, 1898.

FAULT, in mining and geology, the sudden interruption of the continuity of strata till then on the same plane, this being accompanied by a crack or fissure varying in width from a mere line to several feet, generally filled with broken stones, clay, or similar material. There are faults in some sections, of which the horizontal extent is 30 miles or more, the vertical displacement varying from 600 to 3,000 feet, and the width of the fissures filled up ranging from 10 to 50 feet. In hunting, a check, the losing of the scent. In tennis, an improper service. At **fault**, at a loss; in a difficulty; puzzled; **embarrassed**.

FAUN, in Roman mythology, a Latin rural deity who presided over woods and wilds, and whose attributes bear a strong analogy to those of the Grecian Pan. He was an object of peculiar adoration of the shepherd and husbandman, and at a later period he is said to have peopled the earth with a host of imaginary beings identical with himself. They are represented as men with the tail and hind legs of a goat, pointed ears, and projecting horns.

FAUNCE, WILLIAM HERBERT PERRY, an American educator; born in Worcester, Mass., Jan. 15, 1859; was graduated at Brown University in 1880, and at the Newton Theological Seminary in 1884; held pastorates in Springfield, Mass., and New York City; was long a trustee of Brown and Rochester Universities; lecturer at the University of Chicago and at Yale. He was made president of Brown University in June, 1899. He wrote "The Educational Ideals in the Ministry" (1908); "What Does Christianity Mean?" (1912); "Social Aspects of Foreign Missions" (1914); "Religion and War" (1918). He has frequently contributed to various periodicals.

FAURE, FRANÇOIS FÉLIX, President of the French Republic; born in Paris, Jan. 30, 1841; was for a time a tanner in Touraine, but became a wealthy shipowner in Havre. During the Franco-Prussian war he commanded a body of volunteers, and gained the ribbon of the Legion of Honor. He entered the Assembly in 1881; served as colonial and commercial minister in the Cabinets

of Gambetta, Jules Favre, and Tirard, and as Minister of Marine in that of Dupuy. A moderate republican, he was elected president of the republic on the resignation of Casimir-Périer in 1895. He died in Paris, France, Feb. 16, 1899.

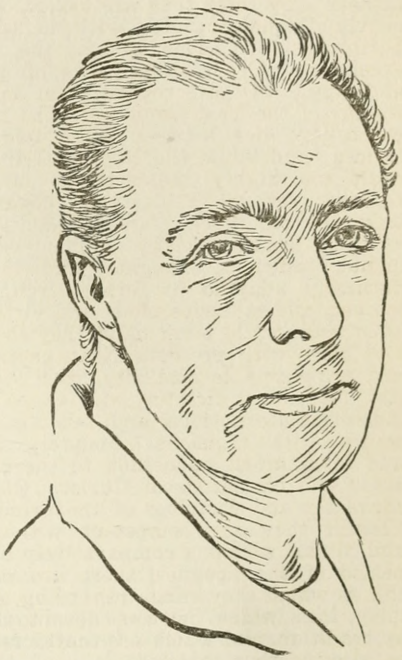
FAUST, or **FUST, JOHANN**, one of the three artists to whom the invention of printing has been ascribed, was the son of a goldsmith at Mentz, Germany. The other two were Gutenberg and Schöffer; to the former of whom the invention of printing with wooden blocks has been attributed; and to the latter, who married the daughter of Faust, is allowed the honor of having invented punches and matrices, by means of which this grand art was carried to perfection. It is believed that he died of the plague in 1466.

FAUST, or **FAUSTUS, DR. JOHANN**, a famous magician, about whose name and existence so many obscure legends have grown, lived in the beginning of the 16th century, and was probably born at Knittlingen, in Suabia. After receiving his education at Wittenberg, he went to Ingolstadt, where he studied medicine, astrology, and magic, and occupied himself in alchemical experiments. Faust was a man of great scientific acquirements; and, according to legendary tradition, he made use of his powers to inspire his countrymen with a firm belief that he had dealings with the devil. The story of Dr. Faustus furnished the subject of a remarkable dramatic poem by Christopher Marlowe, and has been immortalized by the genius of Goethe. Gounod's well-known opera is also founded on this character.

FAUSTINA, mother and daughter, wives of two of the noblest among the Roman emperors. The elder, Annia Galeria, usually spoken of as Faustina Senior, was the wife of Antoninus Pius, and died 141 A. D.; the younger, known as Faustina Junior, was married to his successor, Marcus Aurelius Antoninus, and died at a village near Mount Taurus in 175 A. D. Both, but particularly the younger, were notorious for the profligacy of their lives, yet after their deaths their memories were marked with signal honors by their forgiving husbands. Institutions for the relief of poor girls were founded by both emperors, and were called "*puellæ alimentariæ Faustinæ*" (The Daughters of the Fostering Faustina).

FAUX. See FAWKES.

FAVERSHAM, WILLIAM, an actor, born in England in 1868. He was educated at Hillmartin College. His first appearance on the stage was made in 1887. In the following year he came to the United States. He acted as support for Mrs. Fiske for 2 years and for the 6 years following was leading man at the Empire Theater. He played many important rôles, and was recognized as one



WILLIAM FAVERSHAM

of the leading actors on the American and English stage. In 1902 he married Julie Opp, also well known on the American stage.

FAVRE, JULES CLAUDE GABRIEL, a French advocate, author, and orator; born in Lyons, France, March 21, 1809. He was prosecuting his studies for the bar at the outbreak of the revolution of July, 1830, in which he took an active part. He soon afterward commenced practice and won a reputation for his independence and radicalism. After the revolution of February, 1848, Favre became secretary-general of the Ministry of the Interior. He acted for some time as Under-Secretary for Foreign Affairs, and opposed the expedition to Rome of December, 1848. Favre became the strenuous opponent of Louis Napoleon after the latter's election to the presidency. Favre's defense of Orsini in 1858 created a great sensation. In the same year he became a member of the legislative body; after which time he distinguished himself by his speeches in

favor of complete liberty of the press, against the war with Austria of 1859, and, in 1864, by an attack on the policy of the imperial government in the Mexican War. He became vice-president of the provisional government of national defense, and minister of foreign affairs in September, 1870; signed the definitive treaty of peace with Prussia, May 10, 1871, and resigned his post two months later. He was elected to the French Academy in 1867. He died in Versailles, France, Jan. 19, 1880.

FAWCETT, HENRY, an English political economist; born in Salisbury, England, Aug. 26, 1833. An accident which deprived him of sight early in life did not prevent his attainment of distinction as postmaster-general under Gladstone, and as a writer of force in "Manual of Political Economy" (6th ed. 1883); "The Economic Position of the British Laborer" (1865); "Pauperism: Its Causes and Remedies" (1871); and "Free Trade and Protection." He died in Cambridge, Nov. 6, 1884.

FAWCETT, M. EDWARD, an American Protestant Episcopal bishop, born in New Hartford, Ia., in 1865. He graduated from Upper Iowa University in 1886, afterward studying at the Garrett Biblical Institute. He was ordained a priest in 1897 and was rector of churches in Elgin and Chicago, Ill., until 1903, when he was appointed 3d bishop of Quincy, Ill. In 1917 he was captain and chaplain of the 5th Illinois Infantry and was also a divisional chaplain of the 33d Division.

FAWKES, FAUX, or VAUX, GUY, an English conspirator; born in York, England, in 1570. He enlisted in the Spanish army in the Netherlands, where he was found by Winter, one of the anti-Protestant conspirators, and with him returned to England, in 1604, after agreeing to assist in the Gunpowder Plot. He passed under the name of Johnson, as servant to Thomas Percy, another conspirator, and was placed to lodge in the house next to the Parliament House. After collecting the necessary combustibles, Fawkes worked his way into the coal cellar under the House of Lords, and after storing it with gunpowder, etc., was appointed to the dangerous duty of firing the mine. The government having had timely information of the detestable plot, the House of Lords and its cellar was searched, and Fawkes found secreted amid some casks of gunpowder, Nov. 5, 1605. He was at once arrested, soon after tried, and Jan. 31, 1606, suffered death at Westminster with several of the other conspirators.

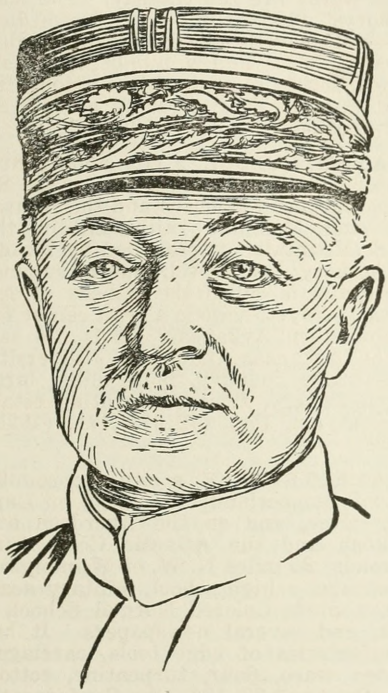
FÁY, ANDREAS (fī or fāy), a Hungarian author; born in Kohány, Zemplin, Hungary, May 30, 1786. Till the appearance of Kossuth on the scene (1840) he was the foremost leader at Pest of the Opposition party. His volume of poems, "New Garland" (1818) established his fame as a poet, but his admirable prose "Fables" (1820) attained a far wider popularity. Among his dramatic works are the tragedy, "The Two Báthorys" (1827); and several comedies. His social novel, "The House of the Béltekys" (1832), and a number of short stories, entitle him to a place among the great masters of Hungarian prose. He died in Pest, July 26, 1864.

FAYETTEVILLE, a city and county-seat of Washington co., Ark.; on the St. Louis and San Francisco and the Kansas City and Memphis railroads; in the Ozark Mountains, surrounded by beautiful scenery; is a well-known summer resort and is called the Athens of Arkansas. Fayetteville is a fruit center for northwestern Arkansas. It is the seat of the Arkansas Industrial University. Here are a foundry, flour mills, large wagon factory, fruit evaporating establishment, etc. Pop. (1910) 4,471; (1920) 5,362.

FAYETTEVILLE, a city and county-seat of Cumberland co., N. C.; on Cape Fear river, and on the Aberdeen and Rockfish and the Atlantic Coast Line railroads; 80 miles N. W. of Wilmington. It contains a high school, military academy, a State Colored Normal School, a bank, and several newspapers. It has manufactories of edge tools, carriages, wooden ware, flour, turpentine, cotton, etc. On April 22, 1861, the Confederates seized the United States arsenal at this point. General Sherman occupied the town March 11-14, 1865, and destroyed the arsenal. Pop. (1910) 7,045; (1920) 8,877.

FAYOLLE, MARIE ÉMILE, a French soldier, born in 1852. He was educated at the Superior School of War, and for several years served as instructor at that institution. He was promoted to be lieutenant-colonel in 1903 and general in 1910. In 1914 he commanded the artillery brigade of Vincennes and in the same year was commander of the 70th Division Infantry. In the following year he commanded the 33d Army Corps and was made commander of the 6th French Army in 1916. In December, 1919, he commanded the French forces in Italy. General Fayolle took part in the first French offensive of Lorraine, where he greatly distinguished himself by energetic action which held up the German

advance. His next important service was in the battles of Arras, during the attempts of the German armies to reach the coast. He showed great skill in anticipating the movements of the enemy. His name, however, is chiefly connected with the Battle of the Somme where he commanded the 4th Army in 1915. In 1918 he was given command of a group of armies, including a portion of the



GENERAL FAYOLLE

American Expeditionary Forces. He was remarkably efficient in withstanding the movement of the Germans at Amiens toward Paris. During the final German retreat he did effective service at Béthune, Château-Thierry, and Montdidier. In 1920 he visited the United States as a representative of General Foch at the Convention of the American Legion.

FAYUM, FAYOUM, or **FAIOUM** (fa-yoom′), a famous valley and province of central Egypt, anciently the name of Arsinoë, and stretching out into the desert, which almost entirely surrounds it. In extent, its length may be taken at 40 miles by a width of 30. It is the most fertile of the Egyptian provinces and produces dhurra, rye, barley, flax, cotton, sugar, grapes, olives, figs, etc. Near the capital (Medinet-el-Fayum) large quantities of roses are cultivated, and are converted into rose water which is highly esteemed. The land capable of cultivation in Fayum is about 493 square miles. Manufactures woolen, linen, and cotton goods. In ancient times, the Fayum contained the artificial lake MOERIS (*q. v.*) and a famous labyrinth.

FEALTY, loyalty; faithful adherence; true service or duty to a superior lord, especially in feudal times.

Fealty, suit of court, and rent, are duties and services usually issuing and arising *ratione tenuræ*, being the conditions upon which the ancient lords granted out their lands to their feudatories; whereby it was stipulated that they and their heirs should take the oath of fealty or fidelity to their lord, which was the feudal bond (*commune cinculum*) between lord and tenant; that they should do suit, or duly attend and follow the lord's courts, and there from time to time give their assistance, by serving on juries either to decide the property of their neighbors in the court baron, or correct their misdemeanors in the court leet; and lastly, that they should yield to the lord certain annual stated returns, in military attendance, in provisions, in arms, in matters of ornament or pleasure, in rustic employments (prædial labors), or (which is instar omnium), in money, which will provide all the rest; all which are comprised under the one general name of reditus, return or rent.

FEATHER, a plume or quill, one of the dermal growths, multitudes of which constitute the covering of a bird. A feather is homologous with a hair from the skin of a mammal, and some of the inferior birds have imperfect feathers suggestive of hairs only. A feather consists (a) of a central shaft, which is tubular at the base. This is inserted in the skin like a plant in the earth, living and growing. (b) Of a web on either side, that on one side being often developed more than on the other. This web is composed of a series of regularly arranged fibers, called barbs. In some cases, of a small supplementary shaft with barbs, called the plumule—*i. e.*, the little plume. Feathers are of two kinds, quills on the wings and tail, and plumes generally diffused. The primary feathers rise from the bone corresponding to the hand in mammals; the secondary feathers from the distal end of the forearm; and the tertiary feathers from the proximal end of the forearm. The feathers are renewed once or twice a year; the bird is languid during the process, but, when fresh plumage is obtained, renews its youth in vigor as well as in beauty.

The beard and quill of feathers have essentially the same composition, about

52.5 per cent carbon, 7.2 hydrogen, 17.9 nitrogen, and 22.4 oxygen and sulphur. Feathers owe their permanent color to peculiar pigments, of which the red, green, lilac, and yellow are soluble in alcohol and ether. Black feathers contain a pigment insoluble in alcohol and ether, but soluble in ammonia.

FEBRIFUGE, a medicine tending to cure, or alleviate fever. As fevers are cured by several classes of medicines, the list of febrifuges would be very numerous, embracing articles from the mineral, vegetable, and animal kingdoms, and comprehending tonics, stimulants, emetics, diaphoretics, purgatives and diuretics.

FEBRUARY, the name of the second month of the year. It contains in ordinary years, 28 days, and in bissextilis, or leap year, 29. By the calendar of Julius Cæsar, February had 29 days except in bissextile, or leap year, when it had 30. But Augustus took a day from it, and added it to his own month, August, that it might not have a less number of days than July, dedicated to Julius Cæsar. Previously August had been called Sextilis, and consisted of 30 days only.

FECHTER, CHARLES ALBERT, a French actor; born in London, England, Oct. 23, 1824; made his first public appearance in 1840 at the Salle Molière, in Paris, after which he went to Florence, Italy, with a dramatic company as leading juvenile. Subsequently he appeared as Seide in Voltaire's "Mahomet," in 1844; as Valère in Molière's great comedy; and as Armand Duval in "La Dame aux Camélias." In 1860 he went to London, where he presented "The Corsican Brothers," "Don César de Bazan," and "Hamlet." In 1870 he came to the United States and played to crowded houses, especially in "The Count of Monte Cristo." He died in Quakertown, Pa., Aug. 4, 1879.

FEDERACY. See FEDERAL STATES.

FEDERAL COUNCIL OF THE CHURCHES OF CHRIST IN AMERICA, a body which grew out of attempts to unite the general activities of the several Protestant denominations. Previous work in avoiding duplication of effort had been accomplished by the Evangelical Alliance, the National Federation of Churches, and the Christian Workers. In 1905 a commission from 30 denominations met in New York City and drew up the Constitution for the Federal Council of Churches of Christ in America. This was an organization founded by the churches themselves and was not a voluntary or individual association as its predecessors in this field had been. Its purpose is to unite the churches for service and it has no power nor intention to unite them in theology or to interfere in any way with the complete independence of each denomination. It meets every four years, the first meeting being held in Philadelphia in 1908. One of its most important commissions is that on "Church and Social Service" which has reported with a statement of the attitude of the Christian Churches on the labor problem. It advocated collective bargaining, reasonable hours of labor and aligned the Churches definitely with the forces of social progress. Among the other commissions of the Council are those on Foreign Missions, Home Missions, Religious Education, Peace and Arbitration, and the Church and Country Life. Investigations are held by these commissions and a large amount of statistical data is at hand which affords a scientific as well as a religious basis for the discussions.

FEDERALS, the name given to those who during the Civil War in the United States fought to maintain the Union of the Federated States, in opposition to the Confederates.

FEDERAL STATES, states united by a federation or treaty which, binding them sufficiently for mutual defense and the settlement of questions bearing on the welfare of the whole, yet leaves each state free within certain limits to govern itself. Switzerland and the United States are examples of this political constitution. Such a union or confederation is sometimes known as a federacy. The term federation indicates centralization in government while confederation is used where state sovereignty is stronger.

FEDERALIST, the name of an early political party in the United States. After the acknowledgment of the independence of the 13 colonies by the mother country, the first task that confronted the successful revolutionists was the erection of a government and the formulation of a constitution. When the deliberative body on whom devolved this duty met, it was discovered that there were various sentiments entertained by its members, these differences of opinion aligning themselves on opposite sides of the great question of organic union. One faction favored the erection of a nation with more or less absence of independence of its constituent members, while the other urged a federation of sovereign states, each one of which should retain its autonomy, and not be amenable to the general government any further than it by actual cession gave that government authority. Those favoring a strong or na-

tional organic union were called Federalists, and numbered in their ranks such men as George Washington, Alexander Hamilton, and others, while those favoring the sovereignty of the States were called Republicans, among them being Thomas Jefferson, James Madison, and others equally distinguished. The Republicans in this contest were victorious. Later in the history of the country the Federalists became known as Whigs, while the Republicans were called Democrats.

FEDOR. See FEODOR.

FEE, a reward, compensation, or return for services rendered. It is especially applied to the money paid to professional men for their services; as, a lawyer's fees, marriage fees, etc.

In feudal law, fee applied to all lands and tenements which were held by any acknowledgment of superiority to a higher lord; land held by the benefit of another, and in name whereof the grantee owed services or paid rent, or both, to a superior lord.

In American and English law, a freehold estate of inheritance, descendable to heirs general, and liable to alienation at the pleasure of the proprietor. (1) A tenant in fee-simple (also called fee-absolute) is one who has lands, tenements, or hereditaments, to hold to him and his heirs forever; generally absolutely and simply; without mentioning what heirs, but referring that to his own pleasure or to the disposition of the law. This is property in its highest degree. (2) Limited fees, or such estates of inheritance as are clogged with conditions, are of two sorts: qualified, or base fees; and fees conditional, so called at the common law; and afterward fees-tail, in consequence of the statute *de donis* (concerning gifts).

(*a*) A base, or qualified, fee is such a one as has a qualification subjoined thereto, and which must be determined whenever the qualification annexed to it is at an end.

(*b*) A conditional fee, at the common law, was a fee restrained to some particular heirs, exclusive of others; as to the heirs of a man's body, by which only his lineal descendants were admitted in exclusion of collateral heirs; or to the heirs male of his body, in exclusion both of collaterals, and lineal females also.

FEEBLE-MINDED, THE, a defective class of children for whom educational advantages are provided by special State institutions. Several State institutions are for the feeble-minded irrespective of age or sex; some are for women or for children only; and one, Washington, is for defective youth generally. There are also a number of private schools for this class of youth.

FEEJEE ISLANDS. See FIJI ISLANDS.

FEELING, the sensation or impression produced in the mind when a material body is touched by any part of the body; a physical sensation of any kind due to any one of the senses; as, a feeling of warmth, or of cold; also a mental sensation or emotion; mental state; sensitiveness.

Classifying them by their functions, they may be divided into centrally initiated feelings called emotions, and peripherally initiated feelings called sensations. These last again are subdivided into epiperipheral sensations, being those which arise on the exterior surface of the body, and endoperipheral sensations, those which arise in its interior. The proximate components of mind are of two broadly contrasted kinds, feelings and the relations between them. Quantity of feeling is of two kinds, that which arises from intense excitation of a few nerves, and that which springs from slight excitation of many nerves.

Feeling and sensibility, taken as moral properties, are awakened as much by the operations of the mind within itself as by external objects. Susceptibility designates that property of the body or the mind which consists in being ready to take an affection from external objects, hence we speak of a person's susceptibility to take cold, or his susceptibility to be affected with grief, joy, or any other passion.

FEHLING'S SOLUTION, a solution used to determine the amount of glucose in a solution. It is prepared by dissolving in 200 cubic centimeters of distilled water, 34.64 grammes of pure crystallized cupric sulphate, previously powdered and pressed between blotting paper, and mixing it with 174 grammes of Rochelle salt dissolved in 400 cubic centimeters of a solution of pure caustic soda. The liquid must be kept in bottles protected from the light, and from absorption of CO_2 from the air.

FEHMARN, or **FEMERN** (fā'mern), an island lying in the Baltic; taken from Denmark in 1864 and now part of Schleswig-Holstein, Prussia. Area, 70 square miles; surface, level; soil, fertile, producing corn. Cattle are abundant. The inhabitants are mostly engaged in fishing and coastwise navigation.

FEISI, ABUL-FEIS IBN MUBÁRAK (fā-ē-sē), a celebrated Indo-Persian poet and scholar; born in Agra, India, in

1547. He surpassed all his contemporaries in philological, philosophical, historical, and medical knowledge, and about 1572 was crowned "king of poesy" in the court of the Emperor Akbar. Of his poems the most noteworthy are his lyrics. Their exalted pantheism brought on him the enmity of the orthodox Muslim clergy. He wrote also many double-rhymed poems; and a Persian imitation of the famous Indian epic "Nala and Damajanti," designed to form the third member of an epic cycle. His scientific treatises were numerous. He died in 1595.

FELDSPAR. See FELSPAR.

FELIDÆ, or **FELINÆ**, the cat tribe, a family of carnivorous quadrupeds, including the domestic cat, lions, tigers, panthers, leopards, and lynxes. In these animals the destructive organs reach the highest perfection. The head is short and almost rounded in its form. The principal instruments of their destructive energy are the teeth and claws. They have six small incisors in each jaw, the exterior ones larger than the rest; two canine teeth in each jaw, eight præmolars in the upper jaw, and four in the lower, and generally four flesh teeth, or true molars, in the upper jaw, and two in the lower, very large, sharp-edged, and terminated by two or three points. In addition to this the tongue is covered with small recurved prickles by which they can clean from the bones of their prey every particle of flesh.

There are no quadrupeds in which the muscles of the jaws and limbs are more fully developed. The skeleton presents a light but well-built mechanism; the bones, though slender, are extremely compact; the trunk, having to contain the simple digestive apparatus requisite for the assimilation of highly organized animal food, is comparatively slender, and flattened at the sides. The muscular forces are thus enabled to carry the light body along by extensive bounds, and thus it is that the larger felines generally make their attack. The five toes of the fore-feet and the four toes of the hind-feet of cats are armed with very strong, hooked, subcompressed, sharp claws. The lower surface of the foot is furnished with thick ball-like pads of the epidermis, on which the animal walks; this gives them the noiseless tread peculiar to this family.

FELIX, CLAUDIUS, or ANTONIUS, a Roman procurator of Judea, before whom Paul so "reasoned of righteousness, temperance, and judgment to come," that he trembled, saying, "Go thy way for this time; when I have a convenient season I will call for thee." Felix rose from slavery, having been manumitted by Claudius Cæsar. His rule in Judea, notwithstanding its severity or rather in consequence of it, was marked by constant disorders and disaffection; and but for the interest of his brother (the notorious freedman Pallas) with Nero, the charges carried up against him to Rome would have been his ruin.

FELIX I., Bishop of Rome. He succeeded Dionysius, 269, and suffered martyrdom in the persecution of Aurelian.

FELIX II., Pope. He occupied the pontifical see during the banishment of Liberius, 355. In reply to a proposition for the recall of Liberius, it was proposed by the Emperor Constantius that Liberius and Felix should reign conjointly, but the people exclaimed, "One God, one Christ, and one bishop!" Felix was exiled in 358, but became Pope again the same year, and died in 359.

FELIX III., Pope; he succeeded Simplicius in 483. He had a holy dispute with the Emperor Zeno, in behalf of the Western Church, and died in 492.

FELIX IV., Pope; a native of Benevento; he ascended the chair after John I., 526. He governed the Church with zeal and piety, and died in 530. He introduced extreme unction.

FELIX V., antipope; the same as Amadeus VIII., Count of Savoy. See AMADEUS.

FELLAHS, the people in Egypt who live in villages and cultivate the soil. They form three-fourths of the population; are the most ancient race in that country, and are generally believed to be the descendants of the old Egyptians, their physiognomy resembling that which is found on the ancient sculptures.

FELLOWS, GEORGE EMORY, an American educator; born in Beaver Dam, Wis., in 1858. He graduated from Lawrence University in 1879 and studied in Germany and in Edinburgh University. For 10 years he taught in the high schools of Appleton, Wis., and other cities. In 1891 he was appointed professor of European history of Indiana University, and from 1895 to 1902 was assistant professor of history at the University of Chicago. In 1902 he was appointed professor of the University of Maine, serving until 1911, when he resigned to become president of James Millikin University. In

1915 he was appointed head of the department of history at the University of Utah. He was a member of many learned societies, and was the author of "Outlines of the 16th Century" (1895) and "Recent European History" (1902).

FELLOWSHIP, a foundation in an English university entitling the holder, who is called a fellow, to participate in the revenues of a certain college, and also conferring a right to rooms in the college, and certain other privileges, as to meals, etc. The annual pecuniary value of fellowship varies, and till of late years it was tenable for life or till marriage. American colleges frequently have fellowships for their graduates, but the conditions of occupancy are not the same.

The pecuniary value of a fellowship in an American college varies from $250 to $800 per annum.

FELSITE, a name given to the dense volcanic or dike rocks found in the Appalachians, in the Rocky Mountains, and elsewhere. The name is applied more particularly to dense igneous rocks whose structure can only be accurately determined by the use of the microscope. A felsite containing crystals of recognizable minerals is known as a felsite porphyry.

FELSPAR, or **FELDSPAR**, a genus of minerals rather than a single mineral. Formerly there were included under it five species—viz.: (1) Adularia or moonstone, (2) common, (3) compact, (4) glassy, and (5) Labrador felspar.

FELSPAR GROUP, in mineralogy, a group of unisilicates; its composition having the protoxide bases lime, soda, potash, and, in one species, baryta, the sesquioxide only alumina; ratio between the two 1.3. Dana includes under it the species Anorthite (Lime felspar), Labradorite (Lime-soda felspar), Hyalophane (Baryta-potash felspar), Andesite and Oligoclase (Soda-lime felspar), Albite (Soda-lime felspar), and Orthoclase (Potash felspar).

Blue felspar, the same as lazulite; common felspar, the same as orthoclase; compact felspar, the same as felsite. It is either compact massive oligoclase, oligoclase felsite, or compact orthoclase, orthoclase felsite, halleflinta. Glassy felspar, the same as sanidine; Labrador felspar, the same as labradorite; lime felspar, the same as indianite, or as labradorite; potash felspar, the same as orthoclase. The name was used specially to distinguish it from albite (soda felspar). Soda felspar, the same as albite.

FELT, the material formed by uniting and compressing fibers of wool, fur, and other substances fit for the purpose, into a compact body, by what is termed the felting process. This consists in mixing the fibers of the materials employed till they become interlaced or matted together in the form of a soft, loose cloth or sheet, which is done by the instrumentality of carding and doffing machines. The cloth is then wound on a roller, and carried to the felting machine, in which the fibers are combined and interlaced still more closely by the action of heat and pressure, till the loose substance is converted into a close, thick material, possessed of great strength and durability. Felt of a fine kind is used for making hats (see HAT); and a coarser description is used for table covers and carpets.

FELTON, CORNELIUS CONWAY, an American classical scholar; born in Newbury, Mass., Nov. 6, 1807. In 1834 he became Professor of Greek Literature at Harvard; in 1860 its president. His publications include many translations from German, French, and Greek, of which "The Clouds" and "The Birds" of Aristophanes are the most distinguished; also "Familiar Letters from Europe" (1864); "Greece, Ancient and Modern" (1867); "Selections from Modern Greek Writers"; etc. He died in Chester, Pa., Feb. 26, 1862.

FEMGERICHTE, FEHMGERICHTE, or **VEHMGERICHTE** (faim-ge-rik'tă), the name of celebrated secret tribunals which existed in Westphalia, and possessed immense power and influence in the 14th and 15th centuries. They are said by some to have been originated by Charlemagne. The femgerichte first came into notice after the deposition and outlawry of the Emperor Henry the Lion, when anarchy everywhere prevailed. In such circumstances the secret tribunals took on themselves the protection of the innocent and defenseless, and inspired with salutary terror those whom nothing else would keep in check. These tribunals soon acquired great power, and spread themselves over the whole of Germany, though their principal seat still continued to be Westphalia. The secrecy with which they carried on their operations, and the power they manifested in carrying out their sentences, rendered them the terror of all Germany. Their number is said at one time to have amounted to 100,000.

Though originally established for the preservation of right and justice, there can be little doubt that they afterward were frequently made use of to carry out party feelings. The members were called

the Wissende, or the knowing ones; and, before being admitted, they must be of blameless life, of the Christian religion, and take a terrible oath. From among the Wissende the Freischöffen (free justices) were elected, who were the assessors of the court and executors of its sentences. The president of the court was called the Freigraf (free count). The general superintendence of the whole of the tribunals was in the hands of the lord of the land, who, in Westphalia, was the Archbishop of Cologne. The chief superintendence, however, was in the hands of the emperor, who was usually, on his coronation at Aix-la-Chapelle, admitted a member of the society.

Their courts were either open or secret; the former were held by day in the open air, the latter by night in a forest, or in concealed and subterranean places. The process of trial, and the circumstances of judgment were different in the two cases; the former decided in all civil causes, the latter took cognizance of such as had been unable to defend themselves sufficiently before the open courts, as well as such as were accused of heresy, sorcery, rape, theft, robbery, or murder. The accusation was made by one of the Freischöffen, who, without further proof, declared, upon oath, that the accused had been guilty of the crime. The accused was then thrice summoned to appear before the secret tribunal, and the citation was secretly affixed to the door of his dwelling, or some neighboring place. The citation mentioned that the accused was to meet the Wissende at a certain hour and place, and to be conducted by them before the tribunal. Here by an oath the accused might clear himself; but the accuser might also oppose it with his oath and the oaths of witnesses. If the accused could not bring forward six witnesses in his favor, the accuser might strengthen his oath with 14 witnesses; and sentence of acquittal did not necessarily follow until the accused had supported his case with the oaths of 21 witnesses. The judges were all armed, and dressed in black gowns, with a cowl that covered their faces like a mask. The condemned, as well as those who did not obey the summons, were then given over to the Freischöffen. The first Freischöffe who met him was bound to hang him on a tree; and if he made any resistance it was lawful to put him to death in any other way. The punishment, however, was rarely inflicted on those who readily appeared, the judges being satisfied with cautioning the offender to redress the wrong he had been guilty of.

At length a great outcry was raised against these courts, and in 1461 various princes and cities of Germany, as well as the Swiss Confederates, united in a league to resist the free judges, and to require that the trial of accused persons should take place in open day.

Their influence, however, was not entirely destroyed until the public peace was established in Germany, and an amended form of trial and penal judicature introduced.

FEMINISM, a term, supposed to have originated in France in 1890, which includes all phases of the modern tendency of women to assert their equality in the social life with men; their right to enter the professions on an equal basis with men, equal suffrage for both sexes in political matters, and a general recognition of the rights of women to interest themselves in public affairs.

The first manifestation of what has been commonly called the "women's rights" movement was the growing demand for equal suffrage, principally in this country and in Great Britain. The demand has been based on the democratic ideals of both these nations, supported by the contention that men formed a superior political class who subjected women, as an inferior class, to political slavery. In Great Britain equal suffrage for the sexes has been a national problem, on account of the centralized system of the British Government. In this country it had, until slightly previous to 1920, been a problem which each State might solve as it saw fit. Thus in several of the Western States, notably Kansas and California, women were granted the right to vote at a much earlier period than it was granted them in other parts of the country.

The growing agitation by women's organizations, however, stimulated public interest in the question, and repeated efforts were made to grant the right of suffrage to women by means of an amendment of the Federal Constitution. The activity of women in war relief work, during the participation of the United States in the World War, rousing universal admiration of their efforts, undoubtedly was the chief cause of the sentiment which carried the amendment through Congress in 1919 (passing the Senate June 7, 1919). In a little over a year the necessary number of State Legislatures had ratified the measure, that of Connecticut being the last to pass its approval, thus enabling women all over the country to participate in the presidential elections in November, 1920.

In other phases of the general movement toward equality of men and women

the United States has been far in the lead over Great Britain and the Continental countries, with the possible exception of the Scandinavian countries. As far back as 1833 the coeducation of men and women was introduced in Oberlin College, and gradually became a common feature of a large number of American institutions of learning. The right of women to a place in the professions has long been recognized in this country, while in other countries women who ventured into the gainful occupations would be socially ostracized.

FEMUR, in vertebrate animals the first bone of the leg or pelvic extremity, situated between the os innominatum and the tibia; in insects the third joint of the leg; it is long and generally compressed; also in architecture, the long, flat, projecting face between each channel of a triglyph in the Doric order.

FENCING, the art of using skillfully, in attack or self-defense, a sword, rapier, or bayonet; but usually taken to mean address in the use of the second of these weapons. In the school of fence, the foil is wielded.

The foil is a circular or quadrangular rod or blade of pliable, highly tempered steel, blunted and covered with leather at the point, so as to prevent accidents in its practice. From its nature, the foil can only be employed in thrusting; and, being edgeless, it can be handled without liability to cutting wounds. Fencers wear a strong wire mask upon their faces, as a defense against accidental thrusts, etc.

Fencing was cultivated by the ancients; the Roman gladiators instructed the soldiery of that period; but as their weapons differed so materially from those of the present day, and as they defended themselves by shields and armor, their methods were infinitely less complicated and efficient than those of the present day. During the period comprised within the Middle Ages, fencing became greatly neglected, and this was owing most likely to the fact that there was a great improvement in the armor worn by knights in battle; from which circumstance battle axes and other ponderous weapons of offense were substituted for the sword.

When metal casing became somewhat, if not altogether disused, fencing came once more into vogue; and as all gentlemen wore swords, and quarrels were frequent, it was absolutely necessary that all should have some knowledge of the "fence." The peculiar state of society in Italy made this even more needed than in any other country, and it followed that the Italians became the best fencers in Europe. Spain next found the art necessary, and soon France, in which latter country it created such a favorable impression that a school was established for its prosecution.

In fencing there are three openings or entrances—the inside, comprising the whole breast from shoulder to shoulder; the outside, which can be attacked by all the thrusts made above the wrist on the outside of the sword; and, finally, low ports, which embrace the armpits to the hips.

FÉNELON, FRANÇOIS DE SALIGNAC DE LA MOTHE, a French prelate; born in the Château de Fénelon, province of Périgord, France, Aug. 6, 1651, was educated at Plessis College in Paris, and at the seminary of St. Sulpice, where he received holy orders in 1675. In 1678 he was appointed head of an institution, then newly organized in Paris, for the reception of female converts to the Roman Catholic faith. His success in the duties here led to his appointment as head of a mission to Saintonge for the conversion of the Huguenots. In 1689 Louis XIV. intrusted to him the education of his grandsons, the dukes of Burgundy, Anjou, and Berri; and in 1694 he was created Archbishop of Cambray. A theological dispute with Bossuet, his former instructor, terminated in his condemnation by Pope Innocent XII., and his banishment to his diocese by Louis XIV. He was the author of the famous "Fables," "Dialogues of the Dead," "The Education of Girls," "Telemachus," "History of the Ancient Philosophers," and numerous other works on philosophy, theology, and belles-lettres. He died in Cambray, France, Jan. 7. 1715.

FENIANS, an Irish secret society named from an ancient military organization of Ireland that became extinct in the 3d century. The Fenian society was formed in the United States probably in March, 1858, by the refugees who crossed the Atlantic after the unsuccessful outbreak of 1848, and had for its object the expulsion of the British Government, or even the Saxons from Ireland, and the conversion of that island into an independent republic. Its originator divided it into district clubs called circles, each with a president called a center; the whole organization being ruled over by a senate, over which a "head center" presided. Its members had to take an oath before being intrusted with its secrets. In January, 1864, they began to attract notice in Ireland, and the next year some of them were seized and imprisoned. Between 1865 and 1867 they made various outbreaks. In 1866 they captured a

British vessel, and made a raid into Canada, but were defeated by the volunteers and censured by President Johnson. In 1867 they unsuccessfully attempted an attack on Chester Castle in England, made other risings, and on Dec. 13 blew in the wall of Clerkenwell prison, killing and wounding a number of innocent people living in adjacent houses. A second Fenian raid into Canada took place in 1870, but was repelled by the militia. The basis for all the Fenian operations was America, where, in 1865, 600 Fenian representatives held a congress. First and last, many Fenians were captured and imprisoned by the British Government, most of whom were after a time released. The organization seemed to become dormant about 1874, and various persons who had been connected with it joined the "Invincibles," formed some years later for the purpose of assassinating government officers or others obnoxious to its members or its chiefs, but not much was known of this latter organization until the murder of Lord Cavendish called attention to them.

FENN, GEORGE MANVILLE, an English story-writer; born in London, Jan. 3, 1831. He graduated from journalism into fiction, gaining prominence by "Eli's Children" (1882), a tale of clerical life; "The Golden Magnet" (1884), a story for boys; "The Master of the Ceremonies" (1886); "High Play" (1898); "A Woman Worth Winning" (1898); "Nic Revel" (1898); "The Silver Salvers" (1898); "The King of the Beach" (1899); etc. He died Aug. 27, 1909.

FENN, HARRY, an American artist; born in Richmond, England, Sept. 14, 1838; removed to the United States in 1856 and later traveled extensively. He achieved great success as an illustrator of books, and was one of the founders of the American Watercolor Society. Some of his best work is contained in "Picturesque America"; "Picturesque Europe"; and "Picturesque Palestine." He died in 1911.

FENNEC (*Canis zerda*), a pretty little fox-like animal about 10 inches long, with a tail of about 5¼ inches. The fur is of a whitish hue, the cheeks large, and the snout sharp like that of a fox. The fennec is found in the whole of Africa.

FENNEL FLOWERS (*Nigella damascena*), named from the deeply-cut involucre of the flower which resembles the leaves of fennel. The name is also given *Nigella sativa*, an annual of the *Ranunculaceæ*. It has finely-cut leaves, with white, or light blue open flowers. The seeds are strongly aromatic, and are used in India for putting with woolen goods to keep away insects. In Palestine and Egypt they are used for flavoring curries.

FENOLLOSA, MARY McNEILL, an American writer, using the pen name "Sidney McCall", born in Mobile, Ala. She was educated at the Irving Academy, Mobile, Ala. In 1894 she married Ernest F. Fenollosa, who died in 1908. She traveled extensively in Europe and Japan, residing in the latter country for about eight years. She devoted much time to the study of Japanese life and characters. She wrote many volumes of verse and fiction, including "Out of the Nest"; "A Flight of Verses" (1899); "The Dragon Painter" (1906); "The Breath of the Gods" (1906); "Blossoms from a Japanese Garden" (1915); "Christopher Laird" (1919).

FEODOR I., IVANOVITCH (fā'ō-dōr), the last czar of the dynasty of Ruric on the throne of Russia; born May 11, 1557. He began his reign in 1584, and being weak, both in body and mind, assigned the government of his affairs to Goudonoff, who seems to have managed them with dexterity and vigor. In his reign the peasants of Muscovy were converted into serfs, and attached to the land. Previously they had enjoyed personal liberty. The conquest of Siberia was achieved by Goudonoff, and many remarkable diplomatic relations with foreign courts were effected. He died Jan. 7, 1598.

FEODOR III., Czar of Russia, and eldest brother of Peter the Great; born June 8, 1656. He ascended the throne when only 19 years of age, and evinced a strength of will and determination of character. His reign is rendered memorable on account of his calling into his presence the Muscovite nobles, who desolated the country with broils about their claims of family precedence, and throwing the rolls of the Razriad or "Arrangement," into the fire. The genealogical records, which did not relate to claims of precedence, were preserved and properly arranged, in accordance with his will. He died in Moscow, April 27, 1682.

FERBER, EDNA, an American writer, born in Kalamazoo, Mich., in 1887. She was educated in the public and high schools of Appleton, Wis., and at the age of 17 began newspaper work, which she continued in Milwaukee and Chicago. She then devoted her attention to short-story writing. Her character sketches in magazines became widely popular. Her books include "Dawn O'Hara' (1911); "Buttered Side Down"

(1912); "Emma McChesney and Company" (1915); and "Cheerful—By Request" (1918).

FERDINAND, the name of several European monarchs, of whom the following are the most noticeable:

EMPEROR OF AUSTRIA.

FERDINAND I., son of Francis; born in Vienna, Austria, April 19, 1793; ascended the imperial throne of Austria in 1835, and continued to pursue the policy of his father, leaving the chief direction of affairs in the hands of METTERNICH (*q. v.*). In his reign, the republic of Cracow was annihilated, and a portion of it added to the empire. During the Revolutionary war of 1848 he dismissed Metternich, and made several concessions which were found insufficient. Vienna revolted in May, and Ferdinand at length retired to Olmütz, and on Dec. 2, 1848, abdicated, having no children, in favor of his nephew, Francis Joseph I. He died in Prague, Austria, June 29, 1875.

EMPERORS OF GERMANY.

FERDINAND I., younger brother of Charles V.; born in Alcalá, Spain, March 10, 1503. He married, in 1521, Anna, daughter of Ladislaus, King of Hungary and Bohemia, became King of Bohemia in 1527, and at the same time contended with John Zápolya for the crown of Hungary. The war lasted many years and was terminated by an unsatisfactory treaty. Ferdinand was elected King of the Romans in 1531, took the title of emperor on the abdication of his brother, Charles V., and was recognized by the electors in 1558. As the Pope, Paul IV., refused to acknowledge his title, it was resolved that the Pope's consent should be thenceforth dispensed with in the election of the emperor. Ferdinand was a moderate and just ruler, and especially aimed at reconciling the conflicting religious parties. He died in Vienna, July 25, 1564.

FERDINAND II., grandson of Ferdinand I.; born in Gratz, Austria, July 9, 1578. He was crowned King of Bohemia in 1617, King of Hungary in the next year, and was elected emperor on the death of his cousin Matthias in 1619. His Bohemian subjects revolted and chose for their king Frederick V., elector palatine, who reluctantly accepted the crown, and lost it by his defeat at the battle of Prague in 1620. Thus began the famous Thirty Years' War, Catholics and Protestants contending for the supremacy. The bigotry and intolerance of Ferdinand led him, at the beginning of the war, to take the most violent measures against the Bohemian Protestants, and 30,000 families quitted the country. He died in Vienna, Feb. 15, 1637.

FERDINAND III., son of Ferdinand II.; born in Gratz, Austria, July 11 (or 13), 1608, made King of Hungary in 1625, of Bohemia in 1627, and succeeded his father in 1637. Sweden and France, being in alliance, gained several advantages over the Imperialists, which terminated with the peace of Westphalia in 1648. He died in Vienna, April 2, 1657.

KINGS OF NAPLES AND SICILY

FERDINAND I., King of Naples, son of Alfonso I.; born about 1424; succeeded his father in 1458. His false and cruel character provoked a civil war, in which John of Anjou took part with the barons, and the king was aided by the Pope, Sforza, Duke of Milan, and by Scanderbeg. The king defeated his rival in 1462, and made peace; but breaking his word war broke out again. Again the king won, and established order by terror. He afterward joined with the Pope against the Florentines; but Lorenzo de Medici, by the bold step of a personal visit to Naples, succeeded in detaching him from that alliance, and negotiated a treaty of peace. He was detested for his debaucheries and cruelties; and at the very time that Charles VIII. of France was setting out on his celebrated expedition for the conquest of Naples, he died, Jan. 25, 1494.

FERDINAND II., King of Naples, son of Alfonso II.; born July 26, 1469, succeeded his father, when the latter abdicated in 1495. He died Oct. 7, 1496.

FERDINAND III., King of Naples, the same as FERDINAND V., OF SPAIN (*q. v.*).

FERDINAND IV., OF NAPLES, AND I. OF THE TWO SICILIES; born in Naples, Italy, Jan. 12, 1751. He ascended the throne in 1759, and reigned in peace and security till the outbreak of the French Revolution in 1792, when, after the death of Louis XVI., he joined the coalition engaged in the general war against France (1793-1796). The victory gained at Aboukir by Lord Nelson again brought Ferdinand into a hostile attitude against the French, who summarily drove him from his kingdom, and inaugurated the Parthenopean Republic in 1799. In the same year, however, his troops regained possession of the capital. In 1806 Ferdinand was again forced to abandon Naples, the crown of which Napoleon I. conferred first on his brother Joseph Bonaparte, and afterward on his brother-in-law MURAT (*q. v.*), Ferdinand, however, continuing to reign in Sicily under English protection. In 1814 the Congress of Vienna finally established Ferdinand as King of the Two Sicilies. Rev-

olutionary movements, set afloat by the secret *Carbonari*, compelled the establishment of a constitution against the advice and interests of Austria, Russia, and Prussia; the first named power marched an army across the Po, defeated the Neapolitan army, and occupied Naples. Ferdinand who, refusing to sanction the liberal declarations of his subjects, had quitted his capital, was then re-established, and ruled thenceforward with absolute power. He died in Naples, Jan. 4, 1825.

FERDINAND II. OF THE TWO SICILIES (surnamed Bomba, from his bombarding Palermo and other cities during an insurrection), son of Francis I. of Naples, by Isabella of Spain; born in Palermo, Sicily, Jan. 10, 1810; succeeded his father in 1830. His reign was marked by unbridled tyranny and frequent insurrection of the oppressed people. In 1848, when half the thrones in Europe were trembling in the balance, Sicily burst out into open rebellion. Naples followed suit and Ferdinand was compelled to summon a parliament, and take oath to adopt and maintain a constitution. After succeeding in suppressing the Neapolitan revolt, Ferdinand, in 1849, dissolved the parliament, and violated his oath by annulling the constitution. After succeeding in subjugating Sicily, his tyranny knew neither bounds nor sense of common decency. Even the most absolute of European sovereigns condemned his rule and grave remonstrances were addressed to him at the Congress of Paris in 1856. These proving unavailing, France and England proceeded in the same year to recall their ambassadors, and suspended all diplomatic intercourse. He died in Naples, May 22, 1859.

KINGS OF PORTUGAL

FERDINAND I.; born about 1345; succeeded his father Pedro I., in 1367. On the death of Peter the Cruel, King of Castile, he assumed the latter title, which produced a war between him and Henry of Transtamara, who ravaged Portugal, and forced Ferdinand to make peace and marry his daughter. This marriage he afterward disowned, and entered into an alliance with John of Gaunt, Duke of Lancaster, who laid claim to the Castilian throne. This war proved very disastrous to the Portuguese, and Ferdinand was obliged to sue for peace. Another war was entered into in which he was supported by the English, and was for a time successful, but was at last under the necessity of making peace. He died in 1383.

FERDINAND, infant of Portugal, son of John I.; passed into Africa, at the age of 14, to attack the Moors, and laid siege to Tangier. He was, however, made prisoner by the Moors, and spent the remainder of his life in captivity, dying of chagrin, 1443.

KINGS OF SPAIN

FERDINAND I., King of Castile and Leon, called the Great, second son of Sancho III., King of Navarre; born about 1000. By the death of Bermudo, in 1037, he became King of Leon. He then made war against the Moors, from whom he took several cities, and pushed his conquests as far as Portugal. He next declared war against his brother, Garcias III., King of Navarre, in which that prince lost his kingdom and his life. He died in Leon, Spain, Dec. 27, 1065.

FERDINAND II., son of Alphonso VII. King of Leon and Castile, gained great advantages over the Portuguese, and made their king, Alphonso Henriquez, prisoner, whom he used with moderation. In the reign of this prince the military order of St. James was instituted, for the purpose of defending the dominions of the Christian powers against the Saracens.

FERDINAND III., surnamed The Saint, son of Alphonso IX.; born about 1200. He obtained the crown of Castile by the abdication of his mother, Berengaria, in 1217, and that of Leon by the death of his father in 1230. He took many places from the Moors; but while he was projecting an expedition against Morocco, died. He was canonized by Pope Clement X., and is regarded as the founder of the University of Salamanca. He died in Seville, Spain, May 30, 1252.

FERDINAND IV., son of Sancho IV.; born in Seville, in 1285, succeeded to the throne of Castile in 1295, at the age of 10 years, under the guardianship of his mother, who governed the kingdom with great prudence. In 1309 Gibraltar was taken from the Moors by the Spaniards. This prince, in a fit of anger, caused two noblemen to be precipitated from a high rock. Just before undergoing this fate, they told him that he would appear before God in 30 hours from that time. Their prediction was verified, and thence he obtained the name of the "Summoned." He died in 1312.

FERDINAND V., called The Catholic, son of John II., King of Navarre and Aragon; born in Soz, Spain, March 10, 1452. He married, in 1469, the Princess Isabella of Castile, in whose right he succeeded on the death of her brother, Henry IV., to the throne of Castile. A rival claimant, Joanna, was supported by Alfonso, King of Portugal, who invaded Leon, and was defeated by Ferdinand at Toro, in 1476. Three years later Ferdinand succeeded his father in the

kingdom of Aragon, thus reuniting the two crowns of Castile and Aragon. He applied himself to the reform of the great abuses in the administration, and in 1480, at the instigation of Torquemada, established the Inquisition at Seville and, after courageous resistance on the part of the people, at Saragossa also. One of the greatest events of this reign was the conquest of Granada. The war with the Moors began in 1483; victory after victory attended the arms of Ferdinand, and in 1492 the capital city was taken after a siege of eight months. The "two kings," as they called Ferdinand and Isabella, made their entrance in January, 1493. The dominion of the Moors in Spain had lasted 800 years. By a cruel edict of the same year, 1493, the Jews in Spain were commanded to receive baptism, or quit the country in four months. Multitudes of them, counted at from 30,000 to 170,000, became exiles, and the prisons were filled with those who remained. It was at this period that Columbus, with vessels furnished by Ferdinand and Isabella, made his memorable voyages and discovered America, which the Pope Alexander VI. assumed authority to give to those sovereigns. The great Cardinal Ximenes was then confessor to Isabella, and in 1495 was made Archbishop of Toledo. In 1500, Gonsalvo was sent to make the conquest of Naples, which, partly by the sword and partly by the most unscrupulous perfidy, he effected. On the death of Isabella, in 1504, the Kingdom of Castile passed to Philip, son-in-law of Ferdinand; but on Philip's death, two years later, Ferdinand again assumed the government. In 1507 Ximenes became first minister, labored successfully for the conversion of the Moors, and achieved the conquest of Oran. The infamous League of Cambray was concluded in 1508. Soon after Navarre was conquered and united to Castile and Aragon. Of Ferdinand's four daughters, one was married to the Archduke Philip, two in succession to Emanuel, King of Portugal, and the fourth, Catharine, first to Prince Arthur of England, and afterward to his brother, Henry VIII. Ferdinand died in Madrigalejo, Spain, Jan. 23, 1516, and was interred in the cathedral of Granada with Queen Isabella.

FERDINAND VI., son of Philip V.; born Sept. 23, 1713. He ascended the throne in 1746, and during the 13 years of his reign was one of the most just and humane monarchs who ever ruled the Spanish destinies. He promoted the internal welfare of his country, reorganized the navy, encouraged manufactures, and by his judicious political conduct placed his elder brother on the throne of Naples, and another under the ducal canopy of Parma. The destruction of Quito, Lima, and Lisbon, by earthquakes, occurred in this reign. He died Aug. 10, 1759.

FERDINAND VII., son of Charles IV.; born in San Ildefonso, Oct. 13, 1784; succeeded his father in 1808. Upon the entry of Napoleon's troops into Spain, Ferdinand was taken prisoner and carried to Valençay, where he and his family remained till 1813, when he was restored to his kingdom. After his restoration, he dissolved the Cortes, and assumed the powers of an absolute monarch. Like all the later Bourbons, "adversity taught him nothing, and in prosperity he forgot nothing." He re-established the Inquisition and those very liberals who had fought for the expulsion of the French from Spanish soil, he persecuted with pitiless rancor. In 1820, his people broke out into rebellion, and re-established the Cortes. Ferdinand was, however, by the aid of French bayonets, restored to his crown, but not to his former absolutism. Bequeathed the crown to his daughter, Isabella, to the exclusion of his brother, Don Carlos—an act that led to a long and disastrous civil war. He abolished the Salic law by pragmatic sanction of 1830. He died in Madrid, Sept. 19, 1833. See CARLOS, DON, DUKE OF MADRID.

FERDINAND I, former King of Bulgaria. He was born in Vienna, in 1861, the youngest son of Prince Augustus of Saxe-Coburg and Princess Clementine of Bourbon-Orleans, who was the daughter of Louis Philippe. He was educated in the schools of Germany and developed a marked taste for natural history. He made several trips, including one to Brazil in 1879. He published his observations in botany. In 1886 he was offered the throne of Bulgaria which at that time was vacant. This he accepted and on Aug. 14, 1887, was crowned Prince of Bulgaria. He was not, however, recognized by the Great Powers until 1896. He married in 1893 Marie Louise of Bourbon, the eldest daughter of Duke Robert of Parma. Following her death, he married in 1908, Eleanor, the daughter of a prince of the house of Reuss. In the same year he took advantage of the political difficulties of Turkey and proclaimed the complete independence of Bulgaria, assuming the title of King. This title was recognized by Turkey and the Great Powers in the following year. Ferdinand took an active interest in the formation of the Balkan League and in the carrying on of the Balkan War of

1912-1913. The victories of the Bulgarian forces in this war increased his prestige, but the collapse of Bulgaria in the second phase of the war brought him discredit both at home and abroad. In spite of the fact that the Bulgarian territory had been greatly enlarged as a result of the Balkan War, Ferdinand, who was a man of great ambition, was deeply disappointed that larger territory had not been secured. At the outbreak of the World War both the Entente and the Central Powers made strenuous efforts to secure the support of Bulgaria. Ferdinand's sympathies were with Germany, while it is believed that the majority of the people, had they been left free to choose, would have preferred to join with the Allies. There is evidence to indicate that Ferdinand, even before the outbreak of actual hostilities, had



FERDINAND I., KING OF BULGARIA

arrived at a friendly understanding with the Central Powers. In September, 1915, after a period of neutrality, Ferdinand finally decided to actively join against the Allied Powers. On the final defeat of Bulgaria in October, 1918, Ferdinand formally abdicated the crown in favor of the Crown Prince, Boris. See BULGARIA; WORLD WAR.

FERDINAND, VICTOR ALBERT MAINRAD, King of Rumania, born at Sigmaringen, Prussia, in 1865, the second son of Prince Leopold of Hohenzollern, and elder brother of King Charles I. of Rumania. His father and his elder brother renounced title to the crown, and Ferdinand was declared presumptive. He became Senator in 1889 and on March 18 of the same year was vested with the title of Prince of Rumania and declared successor to the throne. He married on Jan. 10, 1893, Marie Alexandra Victoria, the eldest daughter of the Duke of Edinburgh. He succeeded his uncle on the death of the latter on Oct. 11, 1914. In spite of the German birth and relationships, his influence was opposed, at the outbreak of the World War, to the participation of Rumania on the side of the Central Powers. He was also opposed during the first years of the war, to active affiliation with the Entente nations. In August, 1917, however, Rumania finally cast aside her neutrality and declared war against Austria-Hungary, and from this time on King Ferdinand's efforts were devoted to the direction of the Rumanian armies and to the welfare of his people who suffered greatly by the repeated Austrian and German invasions. At the end of the war he had firmly established himself in the admiration and affection of his people.

FERDUSI. See FIRDAUSI.

FERGHANA, a province, since 1876, of Russian West Turkestan, formerly the khanate of Khokand, lying among the W. ranges of the Tian-Shan Mountains; area, 28,222 square miles, four-fifths of which are mountainous, the Tchotkal Mountains being in the N., and the Ala-tau and the Trans-Ala-tau chain in the S. The rest of the province consists of the fertile irrigated plain of the Syr Daria (Jaxartes), which traverses Ferghana from N. E. to S. W. The chief towns are Khokand (the former capital), Marghilan (the present capital), Namangan, and Andijan.

FERGUS I., King of Scotland, the son of Fergus, King of the Irish-Scots. He was invited to Scotland to repel the Picts, and for this was chosen king. He was drowned in his passage to Ireland, about 305 B. C.

FERGUS FALLS, a city and county-seat of Otter Tail co., Minn.; on the Red River of the North, and on the Northern Pacific and the Great Northern railroad; is in the heart of the park section of the State, being surrounded by prairie land and forests of pine and hardwood. It contains the Norwegian Lutheran College; high school, public library, an Odd Fellows' Hall, Masonic Temple, court house, Hospital for the Insane, waterworks, electric lights, several banks and newspapers. It has large woolen and flour mills. Pop. (1910) 6,887; (1920) 7,581.

FERGUSON, ELSIE (MRS. THOMAS B. CLARKE), an American actress, born in New York City in 1885. She made her first appearance on the stage in "The

Liberty Belles" (1901) and was at once successful. She played in 1907 in London, in "The Earl of Pawtucket." In the following year she toured the United States in several plays. This was followed by other appearances as star and leading woman. She became one of the most popular of the American actresses. She was also well-known in moving pictures. In 1916 she married Thomas Benedict Clarke, Jr.

FERGUSON, PATRICK, inventor of the breech-loading rifle; born in 1744 in Pitfour, Scotland. Entering the army in 1759, he served in Germany and Tobago. In 1776 he patented his rifle, firing seven shots a minute, and sighted for ranges of from 100 to 500 yards; and with it he armed a corps of loyalists, who helped at the battle of Brandywine (1777) to defeat the American army. Three years later, on Oct. 7, 1780, Major Ferguson fell, defending King's Mountain, South Carolina, with 800 militia against 1,300 Americans. This affair, which was not unlike that of Majuba Hill, turned the tide of S. warfare.

FERMENTATION, a change which occurs in an organic substance, by which it is decomposed.

Alcoholic fermentation was known to the ancients, and is the change which sugar undergoes under the influence of yeast. Before fermentation takes place, cane sugar is transformed into glucose, thus $C_{12}H_{22}O_{11}+H_2O=2C_6H_{12}O_6$. About 95 per cent. of the glucose is converted into alcohol, $C_6H_{12}O_6=2CO_2+2C_2H_5\cdot OH$. Of the other 5 per cent., about 1 part is used by the growth of the yeast, the other 4 parts are converted into succinic acid, glycerin, carbonic acid, and free hydrogen: a larger quantity of these secondary products is formed if the fermentation is slower, or is made with more exhausted and impure yeast. Fermentation takes place most readily at about 24° to 30°. The saccharine liquid becomes turbid, gives off CO_2, and becomes warmer than the air; when the evolution of CO_2 ceases, the yeast or ferment, *torula cerevisiæ*, separates from the liquid which now contains alcohol, glycerin, and succinic acid in the place of the sugar. A small quantity of acetic acid is always formed, probably from the decomposition of the yeast. Most of the natural saccharine juices, as beet-root, potato, and grape juice, when fermented, yield small quantities of alcohols, homologous with ethylic alcohol, forming fusel oil, which contains propyl, butyl and amyl alcohols, also a small quantity of caprioic œnanthyl, and caprylic alcohols.

Butyric fermentation is the conversion of lactic acid, etc., into butyric acid, due to the presence of *Vibrio*, according to Pasteur. Lactic fermentation is the conversion of sugar into lactic acid, said to be due to the presence of *Penicillium glaucum*. It takes place when 2 gallons of milk are mixed with 6 pounds of raw sugar, 12 pints of water, 8 ounces of putrid cheese, and 4 pounds of zinc white; the mixture is kept at a temperature of 30° for some weeks. If the fermentation is allowed to go further, the lactic acid, $CH_3\cdot CH\cdot OH\cdot CO\cdot OH$, is converted into butyric acid, $CH_3\cdot CH_2\cdot CH_2\cdot CO\cdot OH$. Mucus fermentation is the conversion of sugar into mannite, $C_6H_{12}O_6$, gum, $C_{12}H_{20}O_{10}$, and carbonic acid, CO_2, under the influence of a peculiar ferment. Tannous fermentation is the conversion of tannin, in a solution of galls, into gallic acid, $C_{27}H_{22}O_{17}+O_{12}=3C_7H_6O_5+6CO_2+2H_2O$.

FERMO, a walled city of central Italy, till 1860 capital of a delegation of same name, forming part of the states of the Church in the province of Ascoli, 3 miles from the Adriatic, and 32 S. S. E. of Ancona. Its harbor on the Adriatic, called Porto di Fermo, is small, and but little frequented. Fermo was founded by the Sabines before Rome existed, was colonized by the Romans toward the beginning of the First Punic War, and was repeatedly sacked by the Goths and other barbarians. In the 8th century the city was transferred to the Holy See. Pop. about 5,000.

FERMOY, a town in the county of Cork, Ireland. It is situated on both banks of the Blackwater. It is the site of a cathedral, archbishop's palace, two convents, and a college. The chief industries are agricultural products and grist mills. It is an important garrison town with accommodations for 3,000 troops. Pop. about 12,000.

FERN, in botany: (1) General: The filical alliance, consisting of vascular acrogens, with marginal or dorsal one-celled spore cases, usually surrounded by an elastic ring; spores of only one kind. Ferns are leafy plants springing from a rhizome, which creeps below or on the surface of the ground or rises into the air like the trunk of a tree. This trunk does not taper, but is of equal diameter at both ends. It is covered by a hard, cellular, fibrous rind; its wood, when any is present, consists of large, scalariform or dotted ducts; the vernation of the leaves is circinate, their venation often dichotomous. Reproductive organs, consisting of spore cases, arise from the veins on the lower

surface of the leaves or from their margins. The collection of seeds are called sori.

FERN, or FARNE, ISLANDS, a group of 17 rocky islets off the N. E. coast of Northumberland co., England. St. Cuthbert died here, and his stone coffin is still pointed out. The "Forfarshire" steamer was wrecked here in 1838, when nine persons were saved by the heroism of Grace Darling, the daughter of a lighthouse keeper.

FERNALD, BERT M., a United States Senator from Maine; born in West Poland, Me., in 1858. He was educated in the public schools and at Hebron Academy. He engaged in the packing business, in which he became very successful. He was a member of the State House of Representatives, and was for two terms State Senator. In 1909 he was elected Governor of Maine, and in 1916 was elected to the United States Senate. He was re-elected in 1918.

FERNALD, CHARLES HENRY, an American zoölogist; born in Mount Desert, Me., March 16, 1838; was educated at the Maine Wesleyan Seminary; was an acting ensign in the United States navy during the Civil War; and Professor of Natural History at the Maine State College in 1871-1886. In the latter year he was appointed Professor of Zoölogy at the Massachusetts Agricultural College. His publications include "Tortricidæ of North America"; "The Crambidæ of North America"; "The Pterophoridæ of North America"; "Pyralidæ of North America," etc.

FERNALD, CHESTER BAILEY, an American writer; born in Boston, Mass., March 18, 1869. He was a contributor to magazines, and author of "The Cat and the Cherub, and Other Stories" (1896); "Chinatown Stories" (1899); "Under the Jackstaff" (1903); "John Kendry's Idea" (1907); "The White Umbrella" (1919). He wrote a number of plays; notable are: "The Pursuit of Pamela" (1913), and "The Day Before the Day" (1915).

FERNANDEZ, NAVARETTE, (fernän'deth), surnamed El Mudo, or "the Dumb," a Spanish painter; born in Logroño, Spain, in 1526. He was a distinguished pupil of Titian, and became painter to Philip II., for whom he adorned the Escurial with some of its finest pictures. Among his chief works are a "Martyrdom of St. James," a "Nativity of Christ," "St. Jerome in the Desert," and his masterpiece, "Abraham with the Three Angels." His brilliant coloring earned for him the name of the Spanish Titian. He died about 1579.

FERNANDO DE NORONHA, an island in the South Atlantic Ocean, belonging to Brazil. It is 8 miles long, by a mean breadth of 2 miles, and has a rugged, mountainous, wooded surface. It is used as a penal settlement for Brazilian criminals.

FERNANDO PO, an island in the Bight of Biafra, 20 miles from the west African coast, and about 40 in length by 20 in breadth. It is mountainous in the interior, presenting a rich and varied aspect of beauty and fertility. A large portion of its surface is covered with dense forests of valuable timber, while the land gradually rises from the steep and rocky coasts into two peaks culminating upward of 10,000 feet above sea-level. It is well watered, and the sugar cane grows in spontaneous abundance. Yams form the staple food of the natives. Birds, some varieties of animals, and fish are plentiful. The climate is very unhealthy. The capital is Sta. Isabel. This island was discovered in 1471 by the Portuguese, who ceded it to Spain in 1778. The Spaniards eventually abandoned it and the British, in 1824, selected it as a suitable military depot and naval station. They, in their turn, abandoned it in 1834, on account of its insalubrity. The Spaniards again took possession in 1844, and called the island Puerto de Isabel. It is now used by them as a penal settlement, to which, in 1869, several Cuban patriots were deported, as political prisoners.

FERNEY, a village of France, in the department of Ain, five miles N. W. of Geneva. This place not merely owes its celebrity, but even existence, to its having been for a lengthened period the residence of one of the greatest writers of modern times. Voltaire purchased this estate in 1768. Out of a paltry village, consisting of a few miserable cottages, he constructed a neat little town, in which he established a colony of industrious artisans, principally consisting of watchmakers from Geneva. Voltaire resided here, with little interruption, for more than 20 years. During the whole of this period Ferney was to the literary and refined what Mecca is to the Mohammedan world. Voltaire quitted Ferney for the last time on Feb. 6, 1778.

FERNIE, a city of British Columbia, Canada, in the Kootenay district. It is near the Elk river, and on the Canadian Pacific, the Great Northern, and the Morrissey, Fernie, and Michel rail-

ways. The city has several handsome public buildings, including a custom house, a postoffice, public schools, and hospitals. It is the port of entry and the provincial police headquarters for East Kootenay. It is the center of an important hunting region. Its industries include sawmills, railway-car shops, breweries, brick works, etc. The Crow's Nest Pass coal mines are in the neighborhood. Pop. about 8,000.

FERONIA, in mythology, a Roman goddess, commonly ranked among the rural divinities, and worshiped with great solemnity both by the Sabines and the Latins, but more especially by the former; in astronomy, an asteroid, the 72d found; discovered by Peters, on Jan. 9, 1862. Also a genus of *Aurantiaceæ* (citronworts), the order to which the orange belongs. The single species is the wood apple or elephant apple (*F. elephantum*). The fruit is gray with a hard rind. It grows in India. Also an insect of the *Coleoptera, and* family *Carabidæ.*

FERRARA (fair-rar'a), a fortified city of central Italy, capital of province of same name, and formerly an independent duchy under the rule of the House of Este; situate in a low marshy plain, on the left bank of the Volano, 5 miles S. of the Po, 26 N. N. E. of Bologna. Under the rule of its native princes Ferrara was the seat of one of the most polished and refined of the Italian courts. Ferrara contains a cathedral built in 1135, a university and a fine public library (in which are deposited the MSS. and other relics of the poets Ariosto and Tasso), and one of the finest theaters in Italy. Its manufactures and trade are inconsiderable. Ariosto resided in this city, and here, in 1516, was published the first edition of his immortal "Orlando"; and here, too, in 1533, he breathed his last. The house in which he lived is still carefully preserved. Ferrara, besides being the birthplace, was also the place of imprisonment of the poet TASSO (*q. v.*). Cardinal Bentivoglio was also a native of Ferrara. From a small town Ferrara became a walled city, A. D. 670. The family of Este possessed it first as chief magistrates, and afterward as hereditary sovereigns, from about 1030 to 1597; when, on the death of its last duke, and the extinction of the male line of the house, it was taken possession of by the Pope. In 1796, the French entered Ferrara, and made it the capital of the department of Basso Po. In 1814, the Church again recovered it, but in 1859 it became a part of the new Kingdom of Italy. Pop. of commune about 90,000.

FERRERO, GUGLIELMO, an Italian historian. He was born near Naples in 1872, studied law at Pisa and literature at Bologna, and collaborated with Lombroso in producing, "La donna delinquente." His first important work was "Il Mondo criminale italiano," written in collaboration with Sighele and Bianchi. He had already commenced his study of Roman history and between 1902 and 1908 produced his "Grandezza e decadenza di Roma," which has since been translated into the principal European languages. The work shows much original reflection and is boldly critical of Latin and Greek authorities. During 1906, he lectured on Roman history at Paris, and during 1907 and 1908 visited South America and the United States, lecturing at the Lowell Institute and elsewhere. His principal work, in four volumes, is known in English as the "Greatness and Decline of Rome." His other works include: "Characters and Events of Roman History"; "Fra i due mondi" (English translation: "Between Two Worlds"); "Ancient Rome and Modern America: A Comparative Study of Morals and Manners."

FERRET COL (fer'rā), a pass of the Pennine Alps, in Switzerland, connecting Orsières, in the latter country, with Cormayeur, in Piedmont. Height 7,640 feet above sea-level.

FERRIC OXIDE, Fe_2O_3, peroxide of iron, sesquioxide of iron, red oxide of iron, rouge, colcothar. It occurs in nature as red hæmatite, specular iron ore, and is obtained by heating, $FeSo_4$, ferrous sulphate in the preparation of sulphuric acid. It is a red powder, nearly insoluble in acids; it is used as a pigment, and to give an orange or purple color to glass and porcelain, according to temperature. Ferric oxide is not magnetic, and is unaltered by heat. It is used to polish glass, and when finely divided by jewelers under the name of rouge. The hydrated sesquioxide is obtained in a bulky brown precipitate by precipitating ferric chloride by ammonia; soda or potash must not be used, as the oxide retains a large quantity of these substances. The hydrate occurs native as brown hæmatite. Hydrated ferric oxide is soluble in acids forming ferric salts; these solutions dissolve excess of the oxide, which is afterward precipitated as a basic salt. The hydrated oxide is used to remove H_2S from coal gas, and as a mordant in dyeing. It is reduced by organic matter, but is reoxidized in the air. Ferric oxide unites with ferrous oxide to form magnetic oxide of iron, $Fe_2O_3 \cdot FeO$, or Fe_3O_4.

FERROL, a Spanish seaport in Galicia, Spain; on a narrow arm of the sea, 11 miles by water and 33 by rail N. E. of Corunna. A poor fishing town till 1752, it now is one of the strongest fortified places in the kingdom, and possesses one of its three largest arsenals (with dockyards, naval workshops, etc.), while the annual trade reaches about £500,000. The harbor is safe and capacious, and has a very narrow entrance, defended by two forts. The town has manufactures of naval stores, linen, cotton, and leather, and exports corn, brandy, vinegar, and fish. In 1805 a French fleet was defeated by the English off Ferrol. The town was taken by the French in 1809 and 1823, and in 1872 had a republican rising. Pop. about 30,000.

FERRY, FREDERICK CARLOS, an American educator, born in Braintree, Vt., in 1868. He graduated from Williams College in 1891 and took post-graduate studies at Harvard and in Germany. He was on the faculty of Williams College from 1891 to 1917, when he was elected president and professor of mathematics at Hamilton College. He was a member of many educational societies and contributed articles, chiefly on mathematical subjects, to scientific publications.

FERRY, JULES FRANÇOIS CAMILLE, a French statesman; born in Saint Dié, France, April 5, 1832; was admitted to the Paris bar in 1854, and speedily identified himself with the opponents of the empire. In 1869 he was elected to the National Assembly, where he voted against the war with Prussia; and during the siege of Paris by the Germans (1870-1871) he played a prominent part as central mayor of the city. He was minister to Athens in 1872-1873, and in 1879 became minister of public instruction, and began an agitation against the Jesuits. Their expulsion was effected, and brought about the dissolution of the ministry in September, 1880. M. Ferry then formed a cabinet, which remained in office till November, 1881. In February, 1883, he again became premier, with a policy of "colonial expansion," involving a war in Madagascar and the invasion of Tonquin, where a disaster to the French troops brought about his downfall in March, 1885. In 1890 he was made senator. He died in Paris, March 17, 1893.

FERSEN, AXEL, COUNT, a Swedish militarv officer; born in Stockholm, Sweden, in 1755; came to America on the staff of Rochambeau; fought under Lafayette and received from Washington the Order of the Society of the Cincinnati. Later he went to France, where he became a favorite at court, and was the disguised coachman at the flight of the royal family from Versailles during the Revolution. He returned to Sweden, where he was received with honor, and in 1801 was made grand marshal of that country. On suspicion of complicity in the death of Prince Christian of Sweden, he was seized by a mob while marshaling the funeral procession, and tortured to death, June 20, 1810.

FESCH (fesh), **JOSEPH**, Cardinal Archbishop of Lyons, and half-brother of Letitia Ramolino, mother of Napoleon I.; born in Ajaccio, Corsica, Jan. 3, 1763. He was educated in France for the Church; in 1790 he was appointed by his nephew, General Bonaparte, commissary-general of the army of Italy, in which capacity he realized a princely fortune. He afterward resumed his clerical studies, and adopting the profession, was, in 1802, consecrated Archbishop of Lyons. In the year afterward, Fesch received a cardinal's hat, and was sent to Rome as French ambassador. In 1804 he accompanied Pius VII. to Paris, to assist at the emperor's coronation, and in the following year was created Grand Almoner of France. As president of the Council of Paris, he energetically opposed his nephew on many occasions, and especially espoused the cause of the unfortunate Pope. He finally fell into disgrace with the emperor, and retired to Rome, where he died May 13, 1839.

FESS, SIMEON D., an American educator and congressman, born in Allen co., O., in 1861. He was educated at the Ohio Northern University and studied law at the same institution. He was professor of American history, head of the College of Law, and vice-president of the Ohio Northern University, from 1889 to 1902. From 1902 to 1907 he was graduate student and lecturer of the University of Chicago. In the latter year he was appointed president of Antioch College, serving until 1917. In 1910 he was delegate and vice-president of the Ohio Constitutional Convention. He was elected to Congress in 1913 and again in 1915. During this service he was chairman of the committee on education, and during the campaign of 1918 was chairman of the Republican National Congressional Campaign Committee. He wrote "Outline of United States History" (1897); "American Political Theory" (1907); and "Civics in Ohio" (1910).

FESSENDEN, WILLIAM PITT, an American statesman; born in Boscawen,

N. H., Oct 16, 1806; was graduated at Bowdoin College in 1823 and admitted to the bar in 1827. He entered politics and soon acquired a national reputation as a lawyer and a Whig. He was elected to the United States Senate in 1854, and a week after he took his seat made a speech against the Kansas-Nebraska Bill, which placed him in the front rank of senatorial orators. During the Civil War he was conspicuous for his efforts to sustain the national credit. He was made Secretary of the Treasury in 1864, and, having placed it on a firm basis, resigned in 1865 to return to his seat in the Senate. He died in Portland, Me., Sept. 8, 1869.

FESTUBERT, a small town in northern France, three miles S. of Neuve Chapelle, the center of intensive fighting between the British forces and the Germans in the early part of the World War. From it was named the Battle of Festubert, which was a forward movement undertaken by the British during May, 1915, with the object of preventing the Germans from sending re-enforcements to Lens, where the French were being hard pressed. The battle proper began on the morning of May 9, 1915, the British offensive extending from Armentières to La Bassée. The attack lasted several days, but ended in failure, demonstrating the superiority of the Germans in heavy artillery at that time.

FESTUS, PORCIUS, pro-Consul and Governor of Judæa, before whom St. Paul was accused by the Jews; but the apostle appealing to the emperor, Festus sent him to Rome. Also, a celebrated Latin grammarian who lived between the 2d and 4th centuries.

FETICHISM, or **FETICISM**, the worshiping of a fetich. The word fetich is said to be derived from the Portuguese word *fetiso*, bewitched, and was applied originally to the objects worshiped by the negroes of Africa. The term is applied to anything in nature or art to which a magical power is ascribed, as stones, carved images, etc. Fetichism is the worship of material substances, and prevails very extensively among barbarous nations. Among them, tribes, families, and individuals have their respective fetiches; which are often objects casually selected, as stones, weapons, vessels, plants, etc., and the rude worshiper does not hesitate to chastise, or even throw away or destroy his fetich, if it does not seem to gratify his desires.

FEUDAL SYSTEM, that constitutional system which was introduced into Europe by the N. nations after the fall of the Roman power, and which has left important traces of its existence in most European countries. The constitution of feuds had its origin in the military policy of the Goths, Huns, Vandals, and other N. nations, who overran Europe at the declension of the Roman empire. The term feud is of very doubtful derivation, but most probably it is formed from the Teutonic *fee* or *feh*, wages or pay for service, and *odh*, or *od*, property or possession; a feud, then, being the property or possession given as wages for service. In order to secure their newly acquired possessions, and at the same time to reward their deserving followers, the conquering generals were wont to allot large districts, or parcels of land, to the superior officers of the army, and these were by them again dealt out in smaller allotments or parcels, to the inferior officers and soldiers.

According to this system, every receiver of land, or feudatory, was bound, when called on, to serve his immediate lord or superior, and to do all in his power to defend him. Such lord or superior was likewise subordinate to, and under the command of, a higher superior or lord; and so on upward to the prince or general himself. The several lords were also reciprocally bound in their respective gradations to protect the possessions they had given. Thus the connection between lord and vassal was made to wear all the appearance of a mutual interchange of benefits—of bounty and protection on the one hand, and of gratitude and service on the other. In this way the feudal connection was established, and an army was always at command, ready to fight in defense of the whole or of any part of the newly-acquired territory. Thus the feudal constitution, or doctrine of tenure, extended itself over all the W. world; and the feudal laws drove out the Roman, which had hitherto universally prevailed.

This system was adopted in most countries of Europe from the 9th to the end of the 13th century; but it differed in various particulars in the different countries. Though there can be no doubt that feudal principles prevailed to a considerable extent in the polity of the Saxons in England, yet it was only when that country was conquered by the Normans that it was regularly established.

A country, under the feudal law, was divided into knights' fees, the tenant of each of which appears to have been obliged to keep the field at his own expense for 40 days, whenever his lord chose to call on him. For smaller portions of land, smaller periods of service were due. Every great tenant exercised a jurisdiction, civil and criminal, over his

immediate tenants, and held courts, and administered the laws within his lordship, like a sovereign prince. The existence of manor-courts and other small jurisdictions within the kingdom is one of the features of the feudal system. The land escheated to the lord when the tenant left no heir, and it was forfeited to him when he was found guilty either of a breach of his oath of fealty or of felony. There were also fines payable to the lord on certain occasions, as well as aids, reliefs, etc. The vassal had also to attend the lord's courts, sometimes to witness, and sometimes to take part in, the administration of justice; in battle, he was bound to lend his horse to his lord if dismounted, to keep to his side while fighting, and go into captivity as a hostage for him when taken. It was a breach of faith to divulge his (the lord's) counsel, to conceal from him the machinations of others, to injure his person or fortune, or to violate the sanctity of his roof.

FEUILLANTS (fu-e'yănz), a reformed branch of the Cistercian order of monks. It was founded by Jean de la Barrière, abbot of the Cistercian monastery of Feuillans near Toulouse, in 1577, who, being opposed to the great laxity of discipline that then prevailed, introduced a much more austere mode of life. They were declared independent by Sixtus V. in 1589. They were afterward divided, in 1630, into two congregations by Pope Urban VIII., who separated the French from the Italian.

FEUILLET, OCTAVE (fe-yā'), a French novelist; born in St. Lô, Aug. 11, 1821. "The Great Old Man" (1845) was his first story; but the "Romance of a Poor Young Man" (1858), which was dramatized, first made him famous. Among his numerous other novels are: "The History of Sibylla" (1862), "Julia de Trécœur" (1872), "A Marriage in High Life" (1875); "Story of a Parisienne"; "La Morte" (1886). He was also a successful playwright. He was elected to the Academy in 1863. He died in Paris, Dec. 29, 1890.

FEVER, a disease or rather a whole group of diseases, one general, though not universal, symptom of which is increased heat of the skin, besides which the pulse is frequent, and various functions are disturbed. Fevers may be divided into continued, periodic, and eruptive or exanthematous. Under the first are ranked typhus, typhoid, and relapsing fevers; under the second, intermittents and remittents; and under the third variola, rubeola, and scarlatina. Yellow fever belongs to the remittent rather than the continued type; so also does hectic fever. Puerperal fever should be removed to the class of inflammations.

FEZ, a city of Morocco, capital of the province, as it formerly was of the kingdom of the same name, and residence of a kaid or governor. It is singularly and beautifully situated in a funnel-shaped valley, open only to the N. and N. E., the sloping sides of which are covered with fields, gardens, orchards, and orange groves, 95 miles from the Atlantic, 225 N. E. of Morocco, and 80 miles S. E. of Tangier. Fez contains about 100 mosques, the chief of which, called El Carubin, is a fine structure, and possesses a covered place for women who may choose to participate in public prayers—a circumstance unique in Mohammedan places of worship. Public baths are numerous and good. Twice a year caravans go from Fez across the desert to Timbuktu. This city has always been considered one of the chief seats of Moslem learning. Old Fez was founded in 793 by Edris II., a descendant of Mohammed, and continued the capital of an independent kingdom till 1548, when it was, together with its territory, conquered, and annexed to Morocco. Fez has always been held so sacred by the Arabs and others, that when the pilgrimages to Mecca were interrupted in the 10th century, the Western Moslems journeyed to this city, as the Eastern did to Mecca; and even now none but the Faithful can enter Fez without express permission from the emperor. Pop. estimated at 100,000, of which about three-fourths are Moors and Arabs, and the remainder Berbers and other cognate tribes, Jews, and Negroes.

FEZZAN (ancient Phasania Regio, and the country of the Garamantes), a country of central Africa, immediately S. of Tripoli, to which pashalic it is tributary. Its true boundaries are ill-defined, and its area is uncertain. Fezzan is, as far as has been ascertained, the largest oasis, or cultivable tract in the great African desert of Sahara, by which it is surrounded on three sides. A great portion of this region consists of an extensive valley, bounded by an irregular circle of mountains on all sides except the W., where it opens into the desert. No streams (properly so called), but water is plentifully found at a depth of from 10 to 12 feet below the surface of the soil. A few small lakes, incrusted with carbonate of soda, are dotted here and there. The ostrich and antelope are commonly met with, while to the ordinary domestic animals camels may be added. In summer the tem-

perature is insupportably hot, and, on the other hand, the cold of winter is sufficiently severe to be acutely felt by the natives. Some wheat is raised, but maize and barley form the staple grains. Dates, figs, legumes, and pomegranates form an abundant source of food to the denizens. Fezzan derives its chief importance as being a depot for the great caravan traffic between Egypt and Barbary, and the countries to the E. and S. of the Niger. Capital, Mourzouk. Fezzan after the Turkish-Italian War (1911-1912) was by the Treaty of Ouchy placed with Tripoli under the dominion of Italy.

FIALA, ANTHONY, an American explorer; born in Jersey City Heights, in 1869. He was educated at Cooper Union and at the National Academy of Design in New York. After several years spent in various employments, including that of an art engraver, he became war correspondent for the Brooklyn "Daily Eagle" in the Spanish-American War, in which he took part as a 1st lieutenant of the infantry. In 1901-1902 he was photographer for the Baldwin-Ziegler Polar Expedition, and from 1903 to 1905 commanded a second expedition sent out under the same auspices. He accompanied Colonel Theodore Roosevelt on the latter's trip through the Brazilian wilderness in 1913-1914, and made extensive explorations in that region. He served as captain in the machine-gun troop on the Mexican border in 1916-1917, and during the World War served as major in the National Army. He wrote "Fighting the Polar Ice" (1906).

FIBER, or **FIBRE**, a filament, or thread, the minute part of either animal or vegetable substances. The scientific use of fiber is described with regard to the animal kingdom under muscle and tissue; and with regard to the vegetable kingdom, under vegetable tissue, wood, and woody fiber. In its more popular but perfectly accurate use, the word includes the hair and wool of quadrupeds, the threads of the cocoons of silk worms, etc.; the fibers of the leaves of plants and of their inner bark, the elongated cells or hairs connected with the seeds of plants, and the ordinary materials used in making cordage and textile fabrics. Mineral substances are called fibrous in structure even when it is impossible to detach the apparent fibers. The only fibrous mineral which has been used for textile fabrics is *Amianthus*, a variety of asbestos, but that only to a very limited extent. The animal substances used are divided into two classes —the first including hair and wool, and the second the silk of cocoons. Nearly all textile fabrics are made from the first, and the wool of the sheep is the most important division of the class. The hair of the goat, alpaca, camel, bison, and other animals is also used. The hair of most animals is, however, in general, too short to allow of its being used for textile manufacture. The vegetable kingdom yields the largest number of useful fibers, which are obtained from natural orders very different from each other. The carogenous or cryptogamous plants do not, however, afford any. From exogenous plants, fibers are obtained from the inner bark, as in the case of flax, hemp, etc., and from the hairs of the fruit, as in cotton. In endogenous plants the fiber is sometimes obtained from the fruit, as in the cocoanut fiber. The spathe of some palms is also used. Some of the slender palms called rattans, and the bulrush, etc., are much used, on account of their fibrous nature, for wicker-work, chair-bottoms, and similar purposes.

The most valuable fibers obtained from endogenous plants come from the leaf or leaf-stalk. Among the useful vegetable fibers those of flax, hemp, and cotton have long held the first place. The principal additions, of late years, have been New Zealand flax, jute, Sunn or Sunn hemp, coir, Pita flax, Abaca or Manila hemp, Chinese grass, and some others. One of the most important uses of vegetable fiber is in the manufacture of paper.

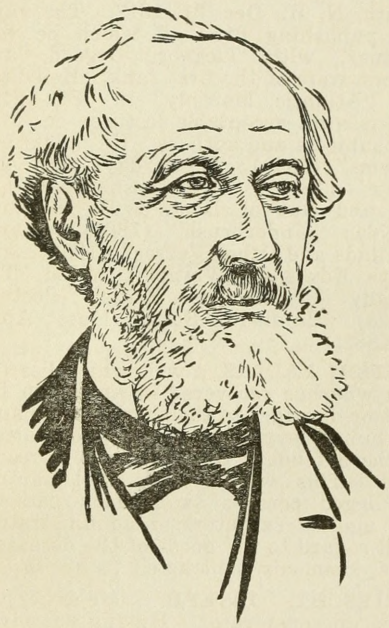
FICHTE, JOHANN GOTTLIEB, a German philosopher; born in Rammenau in Upper Lusatia, May 19, 1762; wrote his treatise, "Essay Toward a Critique of All Revelation" (1792), as a "letter of introduction" to Kant. He was appointed Professor of Philosophy in the University of Jena in 1794; and the following year published his "Doctrine of Science," a fundamental departure from Kant. Of his philosophical writings the most important are: "The Doctrines of Science" (1794); "Foundations of the Whole Doctrine of Science" (1794); "Introduction to the Doctrine of Science" (1798); "System of Moral Doctrine" (1798); "Man's Destiny" (1800). He died in Berlin, Jan. 27, 1814.

FICKE, ARTHUR DAVISON, an American writer, born in Davenport, Ia., in 1883. He graduated from Harvard University in 1904 and after studying law was admitted to the bar in 1908. He was the author of several volumes of prose and poetry, including "From the Isles" (1907); "The Happy Princess" (1907); "The Breaking of Bonds"

(1910); "Twelve Japanese Painters" (1913); and "An April Elegy" (1917). During the World War he was captain of the Ordnance Department. He served in France until July, 1919, rising to the rank of lieutenant-colonel.

FICUS, in botany, a genus of *Moraceæ;* flowers unisexual, the males and females mixed indiscriminately on the inner side of a concave fleshy receptacle, the upper margin of which constitutes a narrow aperture. Flowers separated from each other by soft, colorless, bristle-like bracts or scales. The genus is a very large one, about 600 species being already known. They occur in all the hotter parts of the world.

FIELD, CYRUS WEST, an American capitalist; born in Stockbridge, Mass., Nov. 30, 1819; received a fair



CYRUS WEST FIELD

education; began the manufacture and sale of paper in 1840, and soon became wealthy. About 1845 he turned his attention to ocean telegraphy. In 1854 the Newfoundland Legislature granted him the right for 50 years to land cables between the United States and Europe on that island. He later organized the New York, Newfoundland, and London Telegraph Company, of which Peter Cooper, Moses Taylor, Marshall O. Roberts, and Chandler White were members. In 1866, after many disappointments and failures, a cable was successfully stretched across the ocean (see ATLANTIC TELEGRAPH). For his achievement Congress voted him a gold medal and the thanks of the people. In 1867 the Grand Medal, the highest honor of the Paris Exposition, was bestowed on him. He died in New York City, July 12, 1892.

FIELD, DAVID DUDLEY, an American jurist; born in Haddam, Conn., Feb. 13, 1805; was admitted to the New York bar in 1828; practiced till 1885, distinguishing himself especially by his labors in the direction of a reform of the judiciary system. In 1857 he was appointed by the State to prepare a political, civil, and penal code, of which the last was adopted by New York, and all have been accepted by some other States. In 1866, by a proposal brought before the British Social Science Congress, he procured the appointment of a committee of jurists from the principal nations to prepare the outlines of an international code, which were presented in a report to the same congress in 1873. This movement resulted in the formation of an association for the reform of the law of nations, and for the substitution of arbitration for war, of which Mr. Field was the first president. He died in New York City, April 13, 1894.

FIELD, EUGENE, an American journalist; born in St. Louis, Mo., Sept. 2, 1850. By his poems and tales in the press he won a high reputation in the West. His complete works comprise: "Love Songs of Childhood," "A Little Book of Western Verse," "A Second Book of Verse," "The Holy Cross, and Other Tales," "The Love Affairs of a Bibliomaniac." He made, in collaboration with his brother, Roswell Martin Field, some good translations from Horace — "Echoes from the Sabine Farm." He died in Chicago, Ill., Nov. 4, 1895.

FIELD, HENRY MARTYN, an American clergyman and scholar; born in Stockbridge, Mass., April 3, 1822; brother of Cyrus West and Stephen Johnson Field; was graduated at Williams College, and was ordained to the ministry in 1842. In 1854 he became editor and proprietor of the New York "Evangelist." He was a lifelong traveler. Among his work are: "Summer Pictures from Copenhagen to Venice" (1859); "History of the Atlantic Telegraph" (1866); "From Egypt to Japan" (1878); "On the Desert" (1883); "Among the Holy Hills" (1883); "Our Western Archipelago"; "The Barbary Coast"; "Old Spain and New Spain"; "The Story of the Atlantic Cable." He died in 1907.

FIELD, KATE, an American author and lecturer; born in St. Louis, Mo., about 1840. During several years she was European correspondent of the New York "Tribune" and other journals. She founded "Kate Field's Washington" (1889), in Washington, D. C. Among her books are "Planchette's Diary" (1868); "Ten Days in Spain" (1875); "History of Bell's Telephone"; "Life of Fechter," etc. She died in Honolulu, Hawaii, May 19, 1896.

FIELD, STEPHEN JOHNSON, an American jurist; born in Haddam, Conn., Nov. 4, 1816; brother of Cyrus West Field; was graduated at Williams College in 1837; studied law and was admitted to the bar in 1841; and removed to San Francisco in 1849. He was elected to the first legislature under the California constitution, in the autumn of 1850; prepared a code of mining, civil and criminal laws, which was generally adopted in the Western States; became a justice of the Supreme Court of California in 1857; was appointed its chief-justice in 1859; and in 1863 was appointed an associate justice of the United States Supreme Court, which office he resigned in April, 1897. He died in Washington, D. C., April 9, 1899.

FIELD ARTILLERY. See ARTILLERY.

FIELDING, HENRY, an English novelist; born in Sharpham Park, Somersetshire, April 22, 1707. After only moderate success as a playwright and lawyer he wrote "The Adventures of Joseph Andrews" (1742), to burlesque Richardson's "Pamela"; it grew in his hands into a strong novel of a new type, and his career and fame were determined. His masterpiece is "Tom Jones; or the History of a Foundling" (1749). His last novel, "Amelia" (1752), is characteristic of his sentiments rather than of his genius. He died in Lisbon, Oct. 8, 1754.

FIELDING, WILLIAM STEVENS, a Canadian statesman. He was born at Halifax, Nova Scotia, in 1848, where he was educated, and where he was for 20 years connected with the Halifax "Morning Journal." Since 1882 he has represented Halifax, first in the Provincial Legislature, becoming Prime Minister in 1884 and resigning in 1896 to become Minister of Finance in the Cabinet of Sir Wilfred Laurier. He represented Canada in London in 1902 and at the negotiation of the Franco-Canadian Commercial Treaty, Paris, 1907-1909. He was a member of the commission on Canada-West India trade, 1909-1910, and helped to negotiate the Reciprocity Agreement with the United States in 1911. Since 1917 has represented Shelburne and Queen's in the Dominion Parliament.

FIELDS, ANNIE (ADAMS), an American poet and essayist, wife of James T. Fields; born in Boston, Mass., in 1834; became a leader in charity organization and work. She published: "Under the Olive," poems (1881); "Biography of James T. Fields" (1884); "How to Help the Poor" (1885); "The Singing Shepherd"; "Authors and Their Friends"; "A Shelf of Old Books" (1896); "Life and Letters of Harriet Beecher Stowe" (1897); "Charles Dudley Warner" (1904). She died in 1915.

FIELDS, JAMES THOMAS, an American publisher and author; born in Portsmouth, N. H., Dec. 31, 1817. The various publishing firms of which he was partner, with Ticknor, Osgood, and others, were of the first rank. He edited the "Atlantic Monthly" in 1862-1870; and was an acceptable lecturer on literary subjects and authors. He published: "Poems" (1849); "Yesterdays with Authors" (1872); "Hawthorne" (1875); "In and Out of Doors with Dickens" (1876); "Underbrush" (1881), essays; "Ballads and Other Verses" (1881); and (with Edwin P. Whipple) edited "The Family Library of British Poetry" (1878). He died in Boston, Mass., April 24, 1881.

FIERI FACIAS, a writ which lies for him who has recovered in an action for debt or damages to the sheriff, commanding him to levy on the goods and chattels of the defendant the sum or debt recovered. This writ lies as well against privileged persons as common persons, and against executors or administrators with regard to the goods of the deceased. It is commonly contracted to *Fi. fa.*

FIESCHI, JOSEPH (fē-es'kē), a Corsican conspirator. Having conceived a hatred for the French king, Louis Philippe, in consequence of the deprivation, by the prefect of the Seine, of a situation which he held, he constructed an infernal machine which he discharged from a house in the Boulevard-du-Temple, during a review of the National Guard, July 28, 1835. The king escaped unhurt, but Marshal Mortier and 17 people were killed and many more wounded. Fieschi, with his accomplices, Pepin and Morey, was guillotined, Feb. 16, 1836.

FIFESHIRE, a maritime county of Scotland, in the eastern midland division. It has an area of 504 square miles

and a coast line of 108. The surface is for the most part a succession of valleys and hills. Agriculture is carried on in an advanced state. There are important coal and iron mines and lime quarries. The chief industries are the manufacture of linens, oil-cloth, paper, and malt liquors. The principal river is Eden, which flows N. E. into the North Sea. Pop. about 270,000.

FIFTH-MONARCHY MEN, in English history, a set of fanatics who formed a principal support of Cromwell during the Protectorate. They considered his assumption of power as an earnest of the foundation of the fifth monarchy, which should succeed to the Assyrian, the Persian, the Grecian, and the Roman, and in which Jesus Christ should reign with the saints on earth for the space of 1,000 years. Upon the restoration of the royal family, and the return of the kingdom to its former principles in Church and State, a party of these enthusiasts, headed by a man of the name of Venner, made a desperate insurrection in the streets of London, which was put down with the slaughter of a great number of them.

FIGURE, in arithmetic, a character employed to represent a number. The Arabic figures are 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, by combinations of which any possible number can be represented. In astrology, a horoscope; a diagram of the aspects of the astrological houses. In dancing, the several steps which a dancer makes in order and cadence, considered as they form certain figures on the floor. In geometry, a diagram or drawing made to represent a magnitude upon a plane surface. In logic, the form of the syllogism with respect to the position of the Middle Term. In music, a form of melody or accompaniment maintained throughout the phrase in which it is suggested. In a melody, figure is called sequence. In harmony, a figure relates to the rhythmical observance of a certain form in all the accompanying chords to the melody. Also a musical phrase, or a florid melody. In rhetoric, any mode of speaking or writing in which words are distorted or deflected from their literal and primitive sense; the use of figurative language or expressions; a deviation from the rules of analogy or syntax.

FIJI ISLANDS, a group of over 250 islands belonging to Great Britain, in the South Pacific Ocean. Their total area is 7,083 square miles. The two largest are the Viti Levu, with an area of 4,053 square miles, and the Vanua Levu, with an area of 2,130 square miles. The islands are mostly mountainous, and have a fertile soil, and luxuriant vegetation. The forests contain valuable timber. There is a tropical climate, but it is healthy for Europeans, of whom there are about 3,500. In 1874 the group was voluntarily ceded to England by the king and chiefs. The government is administered by a governor and an executive council. The legislative council consists of 7 elected and 12 nominated members, appointed by the governor. The principal exports are sugar, copra, and fruit. Besides two government grammar schools, there are many mission schools. The pop. on Dec. 31, 1919, was 163,847.

FILAMENT, a slender, thread-like process; a fiber or fine thread of which flesh, nerves, skin, roots, etc., are composed. In botany, that part of the stamen which supports the anther. The filament is usually, as its name imports, filiform or thread-like, cylindrical, or slightly tapering toward its summit. It is often, however, thickened, compressed, and flattened in various ways. It sometimes assumes the appearance of a petal, or becomes petaloid. The filament is usually of sufficient solidity to support the anther in an erect position; but sometimes, as in grasses, *Littorella*, and *Plantago*, it is very delicate and capillary or hair-like, so that the anther is pendulous. The filament is usually continuous from one end to the other, but in some cases it is bent or jointed. In electricity, the carbon thread or conductor in an exhausted glass lamp bulb, which becomes incandescent by its resistance to the electric current.

FILANDER, in zoölogy, *Halmaturus asiaticus*, a species of kangaroo found in the N. of Australia, in the region of King George's Sound. It is about the size of a common rabbit, and has a scaly tail. It is also called the short-tailed kangaroo.

FILARIA, in zoölogy, a genus of *Entozoa*, of the order *Cœlelmintha*, and family *Nematoidea*. The body is filiform, very long, and nearly uniform; head not distinct from the body; mouth round or triangular, naked or with papilæ; it is white, yellowish, or red. They are most commonly found in the abdominal cavity and between the peritoneal folds of mammalia and birds, in the air-cells of the latter. Species are also met with in reptiles, fishes, and insects. *Filaria medinensis* or guinea worm is common in hot climates.

FILIBUSTER, a sea-rover; a pirate; a corsair; a freebooter, or buccaneer; sometimes applied to any military adventurer who undertakes an expedition against a territory, unauthorized by law

or the exigencies of war. The term filibuster, now used in any country where the English language is spoken, was first applied in New Orleans to certain adventurers who, after the termination of the war between this country and Mexico, exerted themselves with setting on foot within the United States military expeditions designed to operate in the Spanish-American countries to the S. of us. The pretended object of these expeditions was the emancipation of those countries from tyranny, foreign or domestic, and the introduction of democratic institutions after the model of the United States. The most noted expedition of this sort was that led by Walker against Nicaragua in 1855. See WALKER, WILLIAM.

FILLET, in ordinary language, a band of metal, linen, or ribbon worn round the head. Also the fleshy part of the thigh; applied most commonly to veal. Also portions of meat or fish removed from the bone and served either flat or rolled together and tied round; the term is specially applied to the under-cut of the sirloin of beef, served whole or cut into steaks, and to slices of flat-fish removed from the bone. In anatomy, a collection of fibers passing upward from the anterior columns of the spinal cord. Also a similar bundle of fibers in the *corpus callosum*.

In architecture, a small flat face or band used principally between moldings to separate them from each other in classical architecture; in the Gothic, Early English, or decorated styles of architecture, it is also used on larger moldings and shafts.

FILLMORE, MILLARD, an American statesman, 13th President of the United States; born in Summer Hill, Cayuga co., N. Y., Feb. 7, 1800. Apprenticed to a wool-carder, he made amends by his zeal in the pursuit of knowledge. His talents and aptitude procured him the notice of Judge Wood, an eminent lawyer who invited the young man to a desk in his office, and offered to defray his expenses while he prepared for the bar. Fillmore accepted the offer, but continued teaching in a school to help pay his way. He moved to Erie county in 1821 and was admitted as attorney two years later. In 1829 he was a member of the Legislature, and in 1832 was elected to Congress as a Whig. In 1847 he was elected comptroller of New York State and a year later Vice-President of the United States. President Taylor entered on his office in March, 1849, and died suddenly in July, 1850. Fillmore became, in virtue of his office, President of the United States. It was the era of the Lopez expedition against Cuba; and of a more than usual bitterness in the relations between North and South on the slavery question. Fillmore made Daniel Webster his Secretary of State. President Fillmore's messages favored the fugitive slave law, and recommended a protective, but not a prohibitory tariff. Under his presidency California was admitted as a new State into the Union. In his final message he had to deplore the



MILLARD FILLMORE

death of Webster; and in March, 1853, he yielded up his office to his successor, General Pierce. He was the candidate of the American party for the presidency in 1856, but he received a very small minority of votes. After his retirement from public life he resided in Buffalo, N. Y., where he died, March 8, 1874.

FILM, a transparent, flexible substance used as a substitute for glass plates for portable photographic work. It consists of a strip of celluloid which is treated with a sensitized coating, the same as is used on plates. See PHOTOGRAPHY.

FILTER BED, a settling pond whose bottom is a filter. It may consist of a reservoir five feet deep, with a paved bottom covered with open-jointed tubular drains leading into a central conduit. The drains are covered with a layer of gravel, and a top layer of sand. The water is delivered upon the surface uniformly, and the rate of subsidence is about six inches an hour. The more

rapid the rate (other things being equal) the less effective the operation.

FIN, the organ by which locomotion is effected in a fish. As a rule fins consist of a membrane supported by rays. Of these organs the two pectoral fins, so called from being situated on the breast, where they are just behind the branchial aperture, are modifications of the anterior limbs in other vertebrata. The ventral fins, so called from being, as a rule, situated on the belly, correspond to the hind limbs in other vertebrata. Often there are also one or more dorsal fins on the back, two anal fins near the anus, while the tail is technically called the caudal fin. In carpentry, a tongue on the edge of a board. In commerce, a blade of whalebone. In machinery, a slip inserted longitudinally into a shaft or arbor, and left projecting so as to form a guide for an object which may slip thereon, but not rotate; a spline or feather. In molding, a mark or ridge left in casting at the junction of the parts of the mold.

FINANCE, the art of managing money matters, the person who professes this art being called a financier. Finances, in the plural, is often used for money itself, but still with a reference to the purpose to which it is to be applied, as where the finances of a country are said to have improved or fallen off. It is used in the United States as in England, rather in a political and economic sense than officially; but in France there have been, from time to time, comptrollers-general of finances, councils of finances, bureaus of finances, etc., and at the present time, Minister of Finances.

FINANCES, UNITED STATES. See UNITED STATES, section FINANCE.

FINCH, FRANCIS MILES, an American poet, and associate judge of N. Y. Court of Appeals; born in Ithaca, N. Y., June 9, 1827. He was graduated at Yale; and was the author of the well-known lyrics "Nathan Hale" and "The Blue and the Gray," and of several popular college songs. He died July 31, 1907.

FINCK, HENRY THEOPHILUS, an American musical critic; born in Bethel, Mo., Sept. 22, 1854. He was graduated at Harvard in 1876; and from 1878 to 1881 studied physiological psychology at Berlin, Heidelberg, and Vienna. He was musical critic of the New York "Evening Post," and a contributor to the "Nation." His works include: "Wagner and Other Musicians" (1887); "Romantic Love and Personal Beauty" (1887); "The Pacific Coast Scenic Tour" (1890); "Chopin, and Other Musical Essays," "Lotos Time in Japan" (1895); "Spain and Morocco"; "Paderewski"; "Primitive Love" (1899); "Songs and Song Writers" (1900); "Eduard Grieg" (1905); "Massenet" (1910); "Henry Strauss" (1917).

FINDLAY, a city and county-seat of Hancock co., O.; on the Toledo and Ohio Central, the Cincinnati, Hamilton and Dayton, the Cleveland, Cincinnati, Chicago and St. Louis, and other railroads; 44 miles S. of Toledo. It is in the heart of the oil and gas fields of Ohio. It contains Findlay College, electric lights, electric railroads, several banks, and numerous daily, weekly, and monthly periodicals. In the vicinity are rich beds of clay and vast deposits of gravel and sand. There are manufactories of glass, pressed bricks, furniture, wooden implements, nails, and an oil refinery, machine shops, foundries, extensive potteries, and rolling mills. Pop. (1910) 14,858; (1920) 17,021.

FINDLAY COLLEGE, a coeducational institution in Findlay, O.; founded in 1882 under the auspices of the Church of God; reported at the close of 1919: Professors and instructors, 19; students, 535. President, W. H. Guyer, A. M., D. D.

FINE ARTS, a term generally applied to those arts in which the artist seeks chiefly to give pleasure by the immediate impression produced on the mind by his work. These arts are thus distinguished from arts which are designed to answer some practical purpose, and so have been termed useful.

Antique, Mediæval and Modern Art.— In its general acceptation, the term antique art is understood to be that of a period antecedent to the revival of the classical studies in western Europe, or before the risorgimento, or renaissance, of the arts from their assumed period of lethargy. There was, in fact, a distinct character about the productions of the artists of the more ancient and the more modern times, which was sufficiently marked to produce in the best of them a separate style of art. The antique school was distinguished by an anthropomorphism and a divination of the human form; the mediæval school was formed on and characterized by a species of contempt for the human figure, and an aspiration after an ideal perfection, and therefore there is something vague and undefined in its efforts to represent the objects it copied; while the modern school has united the indefiniteness of its aim with that clearness of the perception of its objects which is so marked a characteristic of its production. The antique schools date from the dawn of civilization to the end of the 10th century; the mediæval schools date from the

10th to the 15th century; and the modern schools have continued the traditions of the masters of art to the present times.

FINGAL, a personage celebrated in the poems of Ossian, who was his son. He was Prince of Morven, a province of ancient Caledonia, and struggled against the power of the Romans, who were in his time the rulers of England. He also undertook warlike expeditions to the Orkneys, Ireland, and even Sweden, and was a prince of a highly chivalric character. Lived in the 3d century.

FINGAL'S CAVE, a curious cavern formed of basaltic columns, in the Isle of Staffa, one of the Hebrides, on the W. coast of Scotland, 25 miles from Oban. See BASALT.

FINGER ALPHABET. See DEAF AND DUMB.

FINGERING, the art of arranging and managing the fingers on any musical instrument so as to produce the required notes in an easy and graceful manner. A good method of fingering is of the utmost importance to the student, as without it the easiest passages will often appear difficult, and the difficult ones almost impracticable.

FINGER PRINTS. The individual distinctiveness that attaches to the papillary ridges on the palms of the hand, their unchanging characteristic through life, and their broad variations as between one individual and another, are the traits that have led to their study and classification for purposes of personal identification. These characteristics apply especially to the patterns of the fingers, and the circumstance has resulted in much effort among men of science so to facilitate subdivision in cases where such identification is likely to be necessary as to make identification easily available. Up to the present the chief purpose to which the use of finger prints has been put to secure identification has been in the case of criminal classes, but there are not wanting those who see in it uses in many other directions, as in important legal documents where something more certain than mere signature is desirable, and in the army and navy during war. In wills and similar documents the use of the finger print would render forgery almost impossible, while it is an easily available substitute for a signature in the case of an illiterate. In the case of criminal identification, finger prints are now largely in use as a supplement to the Bertillon system, and the combination of the two systems leaves little chance for error. Occasionally finger prints left on doors, windows, and polished surfaces in the course of the commission of a crime have led to the identification of the perpetrators, but success in these cases is not easily obtainable from the imperfect character of the imprints and the difficulty in adequately reproducing them.

FINISTÈRE, the extreme W. department of France, formerly a part of the province of Brittany; surrounded on three sides by the Atlantic and British Channel, and having E. the departments of Côtes-du-Nord and Morbihan; length, 65 miles; breadth about 55 miles; area, 2,595 square miles; pop. about 810,000. The coasts are generally steep, rocky, and indented with many bays and harbors, some of which, as that of Brest, are of the first excellence. Numerous small islands skirt the coast. Surface, diversified, two chains of hills running through the department E. to W. Soil, various. Climate, humid, and subject to tempests and fogs. Agriculture is in a backward state, though oats, rye, wheat, barley, flax, and potatoes are largely raised. Pasturage is excellent, rearing large numbers of cattle. The fisheries yield a good return. The mines of lead at Poullaouen and Huelgoet are the most productive in France. Manufactures, sail-cloth, linen, ropes, leather, oil, tobacco, etc. Chief towns, Quimper (the capital), Brest, and Morlaix.

FINLAND, REPUBLIC OF, (called by the natives, Soumen-maa, "land of marshes"), a country of northern Europe, having N. Russian Lapland; E. the provinces of Archangel and Olonetz; S. Lake Ladoga, the province of St. Petersburg, and the Gulf of Finland; and W. Sweden and the Gulf of Bothnia; length, 600 miles; average breadth, about 240 miles; area, 125,689 square miles; pop. (1918) 3,329,146; chiefly Finns and Lapps; capital, Helsingfors (1918) 187,544.

Topography.—Finland, which is divided into 8 provinces, consists principally of a tableland from 400 to 600 feet above the level of the sea, and interspersed with hills of no great elevation. In the N., however, the Manselka Mountains have an average height of between 3,000 to 4,000 feet. The coasts, particularly on the S., are surrounded by a vast number of rocky islets, separated from the mainland and from each other by intricate and narrow channels, rendering the shores of the country easy of defense in case of hostile attack by sea. But the chief natural feature of Finland is its myriads of lakes, which spread like

a network over a large proportion of its surface; some of them being of very considerable size. The greater number of these are on the S. and E.; they have frequent communications with each other, and generally abound with islands. There are numerous rivers, but none of much importance.

Climate.—The climate is rigorous. Even in the S. the winter lasts from 6 to 7 months, and in the N. from 8 to 9 months. Dense fogs are very frequent; heavy rains take place in autumn, and in May and June the thaws put a stop to nearly all traveling. In the N. the sun is absent during December and January; but during the short summer, while that luminary is almost perpetually above the horizon, the heat is often very great; and near Uleaborg, in about lat. 65°, the corn is sown and reaped within 6 or 7 weeks. Crops in all parts of the land are exposed to the double danger of being destroyed by sudden frosts, and by the ravages of a variety of caterpillar called turila by the natives.

Soil.—The principal geological formations are granite, which very easily disintegrates, hard limestone, and slate. Soil for the most part stony and poor.

Production and Industry.—Finland is chiefly an agricultural country, although the cultivated area covers less than 10 per cent. of the land. There are about 300,000 farms. In 1919 the production of the principal agricultural crops was as follows, in bushels: rye, 11,030,560; barley, 5,634,560; oats, 22,659,000; potatoes, 22,569,480; flax and hemp, 1,222 tons; hay, 2,012,200 tons. The production of butter is an important industry. Over half of the country is covered with pine and spruce forests. These form the chief natural wealth of the country. The main industry is lumbering.

The chief mineral products are copper, pyrite, iron pyrite, magnetite, galenite, and molibdonite. Iron exists in considerable quantities in Lapland, but has not been developed. A small amount of gold is also mined. On account of the war and the high cost of labor, the mineral production in recent years has been small. In 1918 about 2,000 tons of copper, about 3,000 tons of magnetite, about 800 tons of pyrite and about 1,000 tons of iron pyrite were mined. The production of iron ore was about 8,000 tons.

There were in 1916 4,693 manufacturing establishments employing an aggregate of 109,900 workers, and yielding a product valued at 1,458,993,100 marks. The most important industries are the manufacture of paper, iron and mechanical products, textiles, lumber, leather, tobacco, chemicals, and liquors.

Commerce.—The imports in 1919 amounted to £94,956,000, and the exports to £31,717,000. The largest quantity of imports was received from Sweden and Norway followed by Germany and Russia. The chief exports were to Germany, Russia, Sweden and Norway. The chief articles of export were paper, paper mass and cardboard, timber, butter, tar, iron and iron goods, textiles, leather, hides, pitch, and fish. The chief imports were cereals, coffee, and chicory, sugar, fish, iron and iron ware, cotton, machinery, chemicals, and leather ware.

Fisheries.—Fishing is an important industry. Over 7,000 families are engaged in it, employing over 10,000 boats. The chief fish taken is Baltic herring. The catch in 1918 amounted to 9,000 tons.

Transportation.—For inland communication Finland has a remarkably developed system of lakes, which are connected with each other and with the Gulf of Finland by canal. Over 60,000 vessels pass along the canal yearly. There are about 2,600 miles of railway, practically all of which belong to the State.

Banking and Finances.—There were in 1917 437 savings banks with 462,771 depositors, with deposits of nearly £25,000,000. In addition to the State Bank, there were in 1919 22 banks and 7 land mortgage banks. The deposits of all private banks amount to about 3,000,000,000 marks. The mark has a normal value of about 20 cents.

Finances.—The estimated revenue for 1920 was £52,443,026, and the estimated expenditure £55,843,563. The consolidated debt on Jan. 1, 1919, amounted to 662,196,837 marks, of which the foreign debt comprised 329,217,278 marks.

Education.—The system of education is well developed. There is a university at Helsingfors and another at Abo, which, however, is entirely Swedish. This was opened in 1919. There are 70 lyceums, 37 elementary schools for boys and girls, 25 girls' schools, 35 preliminary schools, and 46 popular high schools. In the country there are 3,391 primary schools of higher grade, with 157,215 pupils. In the primary schools of lower grade are 75,332 pupils. There are primary schools in 38 towns, with 43,357 pupils. In addition there are a large number of special schools, including commercial schools, navigation schools, trade schools, technical schools, agricultural schools, etc. The school age in the primary schools is from 7 to 15 years. There were in 1919-1920 in all schools 215,995 pupils, with about 6,000 teachers.

Army.—The army is based on con-

scription and is formed in accordance with a law enacted in February, 1919. It consists of three divisions and one independent brigade. Subordinate to the army command are also heavy artillery, flying, automobile, and intelligence troops. The coastal defense consists chiefly of three artillery coast regiments. There is practically no fleet. In addition to the regular army there is an organization of Civic Safety Corps, in which about 100,000 men are enlisted. The regular army includes about 36,600 men and the volunteer about 105,000 men.

Government.—On Dec. 6, 1917, Finland was proclaimed an independent and sovereign state by the House of Representatives. It was recognized by most of the leading powers. The National Parliament consists of one chamber of 200 members, chosen by direct and proportional election, in which all who are entitled to vote have an equal vote. The suffrage is possessed by all Finnish men and women who have reached their twenty-fourth year. Every citizen entitled to vote is eligible to the House of Representatives. The Diet exists for three years, unless sooner dissolved. The president is elected for six years by the vote of the citizens.

History.—The origin of the Finns is to a large extent unknown. They are thought to have been driven northward from the Volga at the beginning of the 8th century. In the 12th century began the long struggle with the Swedes which lasted over 100 years and ended in the subjection of the Finnish people to Swedish sovereignty. Finland remained for over 500 years as a part of Sweden. The people enjoyed a practical self-government and developed an intelligent civilization. Finland was frequently a battle ground in the war between Russia and Sweden. As the Finnish frontier is only 33 miles from Petrograd, Russia desired to possess the country in order to complete its defenses. This wish was realized in 1809, when Sweden ceded to Russia the Grand Duchy with the Aland Islands. Finland was guaranteed the preservation of its laws, constitution, and religion. This pledge was kept until 1897, when the Russian Government began a series of systematic attacks culminating in 1899 in an edict which removed from the Finnish Diet all matters affecting the Grand Duchy, in common with Russia proper. An attempt to Russianize the country was carried on in the following years with great severity. The people resisted, and in 1905 revolutionary agitation in Russia was supported in Finland. The Czar granted the Diet its old privileges and this was followed by a period of quiet. Women were given the suffrage and other radical changes in the government were made. The government of Russia, however, continued hostile to the self-rule of Finland, and in 1910 a law was passed stipulating that the Russian Duma and the Imperial Council had sole power in matters affecting Russia and Finland together. This practically deprived Finland of home rule. On July 20, 1917, the Diet declared the independence of the country. The Russian Provisional Government in August of the same year ordered the dissolution of the Diet and the summoning of a new one to meet on November 1. Shortly after the meeting of the Diet the Kerensky government fell and on Dec. 9, 1917, the country was proclaimed an independent republic. There followed a period of civil war between the Red Guards (Bolsheviki) and the White Guards (pro-Germans). The Finnish authorities seized the Red Guards and executed many of them. Disturbances continued until the signing of the Brest-Litovsk Treaty between Germany and the Bolshevik Government. Four days later Germany signed a treaty with Finland and German troops were sent into Finland. There was a strong attempt to establish a monarchy, but this was opposed by the people. The country remained under the practical domination of Germany during 1918. General Mannerheim, the organizer of the Finnish White Guard became Regent in December of that year. He used severe measures in ridding the country of Bolshevists and conditions gradually turned to a liberal policy. Professor Staahlberg was elected president of the republic, defeating General Mannerheim on July 5, 1919. A constitution was formulated and the republic was established on a firm basis. In 1920 and 1921 a controversy was carried on between Sweden and Finland as to the disposition of the Aland Islands. A plebiscite was held according to the conditions set down by the Peace Conference and it was maintained by Sweden that this indicated an overwhelming majority in favor of Swedish sovereignty. Finland declared, however, that the islands had been administered as a part of the Finnish province for more than a century and that the majority of them lay nearer the Finnish coast than to the Swedish coast. A commission was appointed by the Council of the League of Nations to make inquiries and submit recommendations as a basis for peaceful settlement.

FINLAND, GULF OF, one of the great arms of the Baltic Sea, extending E. and N. between lat. 58° 40′ and 60°

40′, and between lon. 23° and 30° 10′ E. It has a length of 260 miles, by a varying width of between 25 and 90 miles.

FINLEY, JOHN HUSTON, an American educator; born in 1863 at Grand Ridge, Ill. He was educated at Knox College and at Johns Hopkins University. From 1892 to 1899 he served as president of Knox College, and after that as editor of "Harper's Weekly," and later of "McClure's Magazine." Princeton University appointed him in 1900 professor of politics, and three years later he was elected president of the College of the City of New York. In 1913 he became Commissioner of Education for the State of New York, a position he still holds. In 1917 he went to France as special commissioner representing the State of New York in matters pertaining to education. He is the author of many periodical articles and reviews, and his recent books are: "The French in the Heart of America" (1914); "French Schools in War Time" (1917); "A Pilgrim in Palestine" (1918).

FINNAN, or **FINDON**, a fishing village of Scotland, Kincardine county; 6 miles S. of Aberdeen. It has been long celebrated for its preparation of smoked haddocks, known far and wide as "Finnan haddocks," or "haddies." This delicacy is prepared by gutting, cleaning, splitting, and smoking the fish. The most particular part of the process is the smoking, which should be done by the green branches of the fir tree, or still better, spruce; thus communicating to the fish its peculiar odor and bright yellow color.

FIORD, an inlet of the sea, generally long, narrow, and deep; a term applied in Scandinavian countries to any bay, creek, or arm of the sea which extends inland, and sometimes used to express an inland lake or considerable sheet of water; as, Sogne Fiord. The fiords of Iceland, like those which indent the granitic coasts of Norway, were formed by immense flows of lava, raised and rent by subterraneous forces. In the S. part of the island, the caverns, basaltic colonnades, and natural arches of Stapi remind one of the strangest formations of Ireland, and the beautiful grotto of Antrim. These gulfs, often but half a mile in width, extend as far as 5 or 6 miles into the mountains, where they are surrounded on all sides by perpendicular rocks, rising to an immense height.

FIR, the common name of a large number of coniferous trees, of a pyramidal form and elegant proportions. This name is often used in a sense coextensive with the widest sense of the word PINE (*q. v.*), and therefore so as to include a large portion of the *Pinaceæ* (*coniferæ*), or at least the whole of the Linnæan genus *Pinus*. But the name fir is also often used in a more restricted signification, and the trees so designated are those forming the genus *Abies* of some authors, *Abies* and *Picea* of others, which the greater number of botanists have now agreed in separating from *Pinus*. In the classification of Lindley, all the firs are included in the genus *Abies*. The common silver fir, *Abies picea*, has erect cylindrical cones, 5-6 inches long, and two-rowed leaves, with two white lines upon the under side. It forms considerable woods upon the mountains of central Europe and of the N. of Asia, and attains a height of 150-180 feet, and an age of 300 years. The wood is white, contains little resin, is very soft and light, and is employed for the ordinary purposes of coopers, turners, and joiners, and in ship and house carpentry, also for making bandboxes, and for many fine purposes, especially for the sounding-boards of musical instruments. It yields the beautiful clear turpentine known as Strassburg turpentine. Very similar to the silver fir, but generally of much smaller size, and indeed seldom much above 40 feet in height, is the Balm-of-Gilead fir (*Abies balsamea*), a native of the United States, from Virginia to Canada. The wood is of little value, but the tree yields the Canada balsam. (See TURPENTINE.) The other important species of firs will be seen under their particular names.

FIRDAUSI (fēr-dou'sē), or **FIRDUSI** (-dö-sē), a Persian poet; lived from about 935 to about 1020. His true name was Abul Kasim Mansur. He is the greatest of Persian epic poets. In 1010, after 35 years of labor, was completed his first heroic epic, the "Shāh-Nāmah" (King's Book), in about 80,000 distichs; it recounts the ancient Persian traditions of heroism. His other great poem, "Jussuf and Zulīkha," a religious-romantic epos, is founded on the Biblical story of Joseph and Potiphar's wife. He lived long at the court of Mahmud of Ghazni.

FIRE ALARM, elective signaling equipment connected by wire with a central office for the purpose of notifying the fire department in case of fire. The instrument is usually reduced to its simplest dimensions so that people not familiar with the system may operate it. Fire-alarm boxes contain devices to make and break electric currents. There is usually a wheel provided with teeth separated by a non-conducting substance

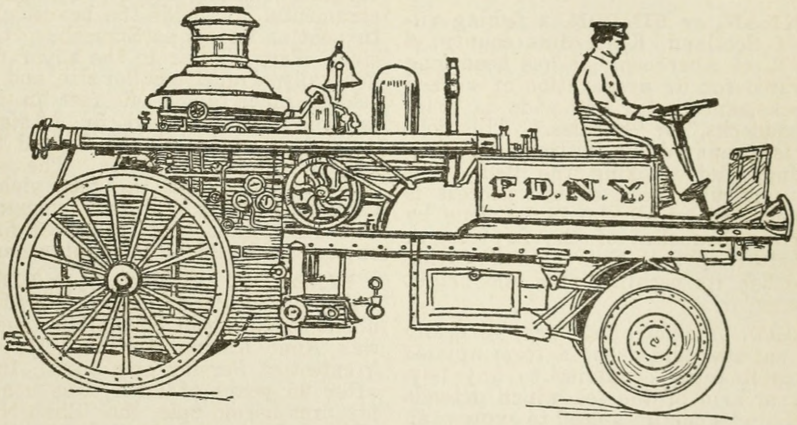
and this when turned comes in contact with a spring which opens and closes the circuit at each tooth, thus producing a signal at the central station. The number of the signal box is usually indicated by the arrangements of teeth and spaces and in that way the fire is located. Access to the crank or chain by which the signal is communicated is obtained either by a key or by twisting the door handle or by breaking the glass—this last being the method most in vogue in large cities. Telegraph instruments connecting with headquarters for the use of firemen are often attached. The signal may be registered on a Morse recording instrument or by some similar device. In some districts there is an apparatus by which the signal results in the ringing of tower bells or the sounding of steam-whistles. The last method, now supplemented by electricity, was formerly in general use, but the development of the electric telegraph has resulted in greater speed and in many simplifications. From the middle of the 19th century telegraph boxes have been in use in Boston, and improvements such as the non-interfering pull and successive feature have brought the fire-alarm system to its present perfection.

FIREARMS. See AMMUNITION; ARTILLERY; EXPLOSIVES; GUN POWDER; ORDNANCE; ETC.

FIREBALL, a ball filled with powder or other combustibles, intended to be thrown among enemies and to injure by explosion, or to set fire to their works. Bombs and grenades were thus employed in the World War (1914-1918).

A popular name applied to a certain class of meteors which exhibit themselves as globular masses of light moving with great velocity, and not infrequently passing unbroken across the sky until lost in the horizon. They differ from ordinary meteors, probably, more in volume and brilliancy than in any other distinctive characteristic.

FIRE ENGINE, a machine employed for throwing a jet of water for the purpose of extinguishing fires. This name was formerly applied to the steam engine. Machines for the extinguishing of fires have been used from a very early date. They were employed by the Romans, and are referred to by Pliny; but he gives no account of their construction. Hero of Alexandria, in his treatise on pneumatics — written probably about 150 years before the Christian era—proposition 27, describes a machine which he calls "the siphons used in conflagrations." It consisted of two cylinders and pistons connected by a reciprocating beam, which raises and lowers the pistons alternately, and thus, with the aid of valves opening only toward the jet, projects the water from it, but not in a continuous stream, as the pressure ceases at each alternation of the stroke. The first application of the steam fire engine was made when the Argyle Rooms in London were burned in 1830. Floating fire engines have been constructed and worked by steam. The steam fire engines have been greatly improved, and steam of more than 100 pounds pressure on the square inch can be raised in seven minutes after making the fire. Some of these engines throw a jet to a vertical height of about 200 feet, or can drive water horizontally through half a mile of pipe. Gasoline motor-driven engines now largely in use can be started instantly and make 35 miles an hour. The



FIRE APPARATUS—ELECTRIC STORAGE BATTERY ENGINE

same engine drives and pumps the water. Those preferred are six cylinders of 70 h. p. pumping 700 gallons of water a minute. Chemical engines, motor driven, are within the means of the smallest towns and require only two men and a pilot to operate.

FIRE ESCAPES are of two distinct kinds—one for affording aid from outside, and another for enabling those within the house to effect their own escape. Of the latter the simplest is a cord that should be firmly attached to the window sill of every sleeping apartment, and coiled either in a box on the floor, or under a dressing table, or other suitable place. A rope one-quarter or three-eighths of an inch thick, and knotted at intervals of about one foot, is well adapted for the purpose. A pulley fixed to the window sill, over which runs a rope with a chair or simple board to sit on, is a well-known contrivance. Fire escapes, to be used from without, consist either of simple ladders kept at convenient stations, or a series of ladders that can be joined together; or ropes with weights at one end that they may be thrown or shot into windows. Large buildings generally have permanent iron stairways attached to the outer walls for use in the case of fire.

FIRE EXTINGUISHER, or **FIRE ANNIHILATOR**, an apparatus intended for extinguishing fire by the spraying of specific liquids, such as water charged with carbon dioxide or some other gas impervious to combustion. These extinguishers are usually cylindrical in form, made of a metal both light and strong, containing a solution of soluble carbonate, and in an upper glass receptacle a quantity of sulphuric acid which mingles with the carbonate solution when the cylinder is inverted preparatory to its use. The resultant carbon dioxide during its process of generation drives the saturated liquid through a valve, nozzle, or other opening, by the manipulation of which it may be directed on the flames. The extinguishers may be of a size convenient for carrying or they may be large enough to require moving on wheels, as in factories. A more elaborate arrangement is the sprinkler system, consisting of pipes running under the ceiling in the successive stories of an establishment, from which water is automatically released when a given temperature is reached, supplemented by the use of certain chemical agents. A smaller form of extinguisher is the hand grenade, containing solutions such as chlorine, and mixtures of calcium chloride, which is thrown bodily in the flames where the fire is at its inception.

FIREFLY, popularly, a comprehensive name for any small insect which flies and is luminous. They belong to the *Lampyridæ* and the *Elateridæ*. The *Fulgora lanternaria*, or lantern fly, a homopterous insect, is too large to be called a firefly. The glowworm (*Lampyris noctiluca*) is also excluded, because the luminous sex, the female one, only crawls. In the case of several *Lampyri* in hot countries, the female, like the male flies. The firefly of the S. of Europe is *Lampyris italica*, that of this country *L. canadensis*. An East Indian species may be seen in myriads during the rainy reason glancing round trees. The firefly of South America is one of the *Elateridæ* elaters, or *Pyrophorus noctilucus*.

FIRE ISLAND, the most W. end of a strip of the Great South Beach, Suffolk co., N. Y., 40 miles long, averaging one-half mile W., off Long Island, between Great South Bay and the Atlantic Ocean. It is reached by ferry from Babylon. The beach took its name from the fires built there as signals to vessels during the war with England, in 1812. Between the beach and the mainland, in Great South Bay, are five small islands. About 45 miles E. of the inlet to the bay Great South Beach joins the mainland. The entire strip is dotted with popular and well-known watering-places. To the east there is a lighthouse 185 feet high with a revolving light.

FIRELESS COOKER, a mechanical arrangement by which hot or partially cooked food can be kept at a temperature which will complete the cooking and allow the food to be served still heated. To this end the cooking pot has to be inclosed in a box or other receptacle provided with insulating material in sufficient thickness and quantity. The insulating materials most in use are asbestos and mineral wool, but there is great variety in the materials that may be used, the object in every case being to conserve the heat sufficiently to allow the food to be thoroughly cooked, and to keep it at the required temperature for a given time. Among the fireless cookers on the market, some supplement the insulating material with metal plates that may be heated and placed under the pot. The principle is a simple one and has been used by housewives in various forms from time immemorial, so that there is a great variety in the mechanical devices employed. The chief considerations are that the arrangements should be convenient and the danger of causing fire be obviated.

FIRELESS ENGINE, vapor or steam engine, acting independently of any

heating apparatus or combustion. In its simplest form the engine consists of a tank filled with water and condensed steam, from which valves allow the steam to emerge and exert pressure on cylinder and piston. By this device sufficient steam is capable of being stored to carry a locomotive and several cars over a distance of several miles. The engine may be replenished with a fresh supply of steam as occasion requires. This form of steam engine has been found serviceable under certain conditions, but there are other forms of fireless engines which have been found convenient. In one form, invented in 1870, by Lamm of Louisiana, the motive power was furnished by vapor of ammonia, and the engine was used for a number of years in running street cars. Its great advantage was that the vapor of ammonia could be used over and over again, a reservoir of water absorbing the vapor as it emerged from the engine and releasing it again when the proper temperature was reached. The advantages to be derived from the use of engines that can dispense with the use of fire-boxes are many, and they have been developed to a still higher level by the arrival of compressed-air and similar locomotives.

FIRELOCK, a musket or other gun, with a lock furnished with a flint and steel, by means of which fire is produced in order to discharge it; distinguished from the old matchlock, which was fired with a match.

FIREPROOF, proof against fire, incombustible. Buildings are rendered fireproof by constructing them entirely of brick or stone, and using iron doors, lintels, etc., and stone stairs. Wood can be treated with silicate of soda, which, on the application of a strong heat, fuses into a kind of glass, forming a shield against fire. Cloth or wood impregnated with certain saline substances will not blaze. Borax, alum, and phosphate of soda or ammonia are recommended as most suitable for this purpose. By treating cloth with graphite in a bath in which the mineral is suspended, and then subjecting it to the action of the electro-metallic bath, the cloth may be coated with metal. Woolen and ordinary stuffs may be treated with borax, alum, or soluble glass, but these cannot well be applied to the lighter descriptions, which are most liable to take fire.

Fireproof building, a term somewhat loosely applied, and may be held to mean: (1) A building absolutely incombustible, such as one whose walls, floors, and roofs are of metal, stone, brick, or cement. (2) A building capable of opposing the access of fire from without, having walls, window shutters, and roofs which are incombustible from external flame and heat.

Fireproof structure, a vault, safe, or building proof against destruction by fire, either from the outside or by the burning of its contents.

FIRE PROTECTION. From the very earliest times, since men first began to live together in communities, organized fire protection has been a function of local government. So far as despatch and efficiency are concerned, the municipal fire department of ancient Rome was little behind the fire departments of modern cities at the present time. In various districts of the city brigades of fire fighters were barracked, whose members were ever ready to respond to the call of the fire guardians, sentinels stationed in high towers, watching for the first signs of a blaze. At the sound of the bucina, as the horn which sounded the alarm was called, the Roman firemen hurried to the scene of the fire, equipped with ladders, axes, buckets, and even with a large water squirt on wheels, which was fed water with buckets. Directing the operations of the brigades was the fire centurion, corresponding to our fire chief, who arrived in a special chariot drawn by four fleet horses.

Pumps, hose and, above all, municipal water systems, have brought about improved equipment for fire fighters since then, but hardly any better organization.

In no country in the world has fire protection reached so high a degree of perfection as in the United States, for the simple reason that in no other country has there ever been so high a percentage of loss through fire. Whether because of the fact that frame houses are more common here, or that the American people are naturally more careless, statistics prove that the loss of property from fire in this country, amounting to about $15 per family each year, is ten times greater than in any other country.

Instead of exercising precaution through legislation or by fixing legal responsibility on house owners, American cities have, instead, organized remarkably efficient fire departments, whose contingents have invariably won the competition prizes at the international expositions.

Throughout the country towns volunteer fire departments are still the rule, but in every community approaching the dignity of a municipality paid fire fighters are maintained.

Within the past few years, however, notably since the big fire in San Francisco, in 1906, the emphasis has been placed on prevention, rather than on fighting fires already started. In practically all cities strict ordinances are passed regarding fireproof structures in the commercial districts. But not only must the buildings themselves be built of fireproof material, but wired glass for windows must be used, floors must be insulated, to prevent heat being transmitted from the burning contents of one story to material above or below. The most effective device for the prevention of fire is the automatic fire sprinkler, whose use makes a difference of from fifty to seventy-five per cent. in the cost of insurance. The principle of the automatic fire sprinkler is quite simple. Pipes, filled with a continuous supply of water, pass back and forth under the ceiling, perforated with holes which are plugged with wax, or a soft solder. With a rise in the temperature above a certain degree, these plugs melt and the water begins pouring forth. It has been estimated that the automatic sprinkler has reduced the loss by fire in commercial districts by at least 70 per cent.

FIRE WORSHIPERS, the Zoroastrians called also Guebres. Herodotus, about 450 B. C., said "The Persians think fire to be a god." Strabo, about 50 A. D., says, "They peculiarly sacrifice to fire and water, placing dry wood on the fire stripped of its bark, with fat thrown upon it." The Rev. Dr. Wilson, of Bombay, alleges that "they actually address it in supplication, as if it were sentient, intelligent, divine, and omnipresent, and ready to hear, bless, assist, and deliver." No prominent race now in India has become more rapidly modified by intercourse with Europeans. The fire worshipers have, in the course of their history, suffered the most cruel persecution from the Mohammedans.

FIRST FRUIT, the fruit or produce first matured or collected in any season; first profits of anything; first or earliest effects of anything, in a good or bad sense. In ecclesiology, that portion of the fruits of the earth and other natural produce, which, by the usage of the Jews and other ancient nations, was offered to God. The mediæval ecclesiastical impost known under the name of *primitiæ*, or first fruits, and sometimes of *annates* or *annalia*, was the first year's whole profits, first of a bishopric, and afterward of any benefice, claimed by the Pope. This claim was the subject of many contests in Germany, in France, and in England. Henry VIII. withdrew the right of first fruits from the Pope, in order to transfer it to the king; and he established a special court for the administration of first fruits. In the reign of Anne, the revenues arising from this impost in England were vested in a board, to be applied for the purpose of supplementing the incomes of small benefices.

FISCHART, JOHANN (fish'ärt), a German satirist; born in Mainz, in 1545. He took the doctor's degree in the University of Basel, in 1574, and afterward was an official of the Imperial Chamber of Justice at Spires. The period of his literary production lies between 1575 and 1581, while he assisted his brother-in-law Jobin, who had a printing office in Strassburg. Among his compositions in verse may be mentioned: "The Jester in Rhyme" (1571); "Description of the Four-Cornered Hat" (1580), against the Jesuits; the "Flöhhatz Weibertratz" (1573); "Podagramic Book of Consolation" (1577), "The Hive of the Holy Roman Swarm" (1579). In imitation of Rabelais's "Gargantua," but giving free play to his own native humor and wit, he wrote of "The Wondrous Deeds, Thoughts and Words of the Famous Heroes and Lords Grandgusier, Gargantua, and Pantagruel" (1575). He died in Forbach, in 1591.

FISH, the name applied to a class of animals exclusively aquatic, and occupying the fourth and lowest station of the section *Vertebrata*. The head is large, and set on the body without the intervention of any distinct neck; the body is usually of a spindle-shape, tapering gradually toward the extremity; and the surface is usually smooth, without any irregularities which might impede the motion of the creature in its native element. In its general form the body is usually rounded, or slightly compressed at the sides; sometimes this flattening proceeds to a much greater extent, so that the animal presents the appearance of a broad band, or oval disk, of which the edges correspond with the dorsal and ventral surfaces; in other cases, the flattening takes place from above downward, producing a disk-like body, of which the upper and lower surfaces are dorsal and ventral. A fish may be shortly defined as an animal breathing through the medium of water by means of gills. This latter apparatus is the most important feature presented. It is situated on each side of the neck, and consists of numerous laminæ fixed on arches. These laminæ are covered with numerous blood-vessels, and are so constructed as to present a considerable surface to the water, so that the blood may receive a sufficient portion of the oxygen

contained in that element. As the water in contact with the gills becomes deteriorated, it is necessary that a constant current be caused to flow over them. In most fishes this is effected by their taking water in at the mouth and expelling it at the gill-covers. The blood, which is constantly sent from the gills to the heart, is distributed by means of the arteries to every part of the body, whence it returns to the heart by means of the veins. Animals of this order are for the most part furnished with an air-bladder in the interior of the body, which, as it is often connected with the œsophagus by a tube, must be regarded to a certain extent analogous to the lungs of the air breathing *Vertebrata*. This sac or air bladder, however, has nothing to do with respiration; it receives blood from the arteries, and returns it into the veins and the air which it incloses is probably derived from this fluid. By the dilatation or compression of this sac, the specific gravity of the fish is governed, and, acted on by a curious muscular apparatus, renders its possessor lighter or heavier than the surrounding element. The limbs of the fish are formed into fins; the forelegs constituting what are termed the pectoral fins, and the posterior extremities, the ventral. Besides these, ordinary fishes are furnished with one or two dorsal fins, an anal fin, and a caudal fin, or tail.

The principal organ of motion is the caudal fin, or tail; by this it is propelled. The dorsal and ventral fins serve to balance it, and the pectorals to arrest its progress when required. The bones of fishes are of a less dense and compact nature than in the higher order of animals, and always remain in an isolated state, similar to that of the embryo of the *Mammalia*. The head varies more in form than in any other class of vertebrate animals. The same bones as those found in other oviparous animals are almost always traceable. The upper jaw consists of maxillary and intermaxillary bones. In the greater number of fishes, the intermaxillary bones constitute the chief portion of the upper jaw, the maxillary bones being placed behind and parallel to them. The lower jaw is composed generally of two bones on each side, the dental portion in front, and the articular portion behind. The form of the body is for the most part such as mechanical principles teach to be best adapted for moving with least resistance through a liquid medium. The surface of the body is either smooth and lubricous, or is covered by closely imbricated scales, rarely defended by bony plates or roughened by hard tubercles, still more rarely armed with spines. The power of touch can be but feebly developed in fishes. The organ of taste is a very inconspicuous one—the chief function of the framework supporting it, or the hyoidan apparatus, relating to the mechanism of swallowing and breathing. Of the organ of hearing there is no outward sign; but the essential part, the acoustic labyrinth, is present, and the semicircular canal, largely developed within the labyrinth, is without cochlea, and is rarely provided with a special chamber, but is lodged, in common with the brain, in the cranial cavity. The eyes are usually large, but seldom defended by eyelids, and ever destitute of a lachrymal organ.

The alimentary canal is commonly short and simple, with its divisions not always clearly marked, the short and wide gullet being hardly distinguishable from the stomach. The blood of fishes is red but cold, and is rarely elevated above the temperature of the surrounding element. The sexes of fishes, excepting the sharks and rays, offer no very decided external characters by which they may be distinguished. The respiratory organs, however, occupy more space in the males than in the females, and, on the other hand, the abdomen is larger in the females than in the males. The differences of character in the scales have been made the foundation of a classification of fishes by Agassiz, by whom all fishes are distributed into the following four orders of cycloid, ctenoid, placoid, and ganoid fishes, having respectively cycloid, ctenoid, placoid, and ganoid scales; a classification which has been found particularly convenient with reference to fossil fishes.

FISH, HAMILTON, an American diplomatist; born in New York City, Aug. 3, 1808; was graduated at Columbia College, and admitted to the bar in 1830. A Whig in politics, he was elected a congressman in 1842, and governor in 1848. In 1851 he was returned to the United States Senate, where he opposed the repeal of the Missouri Compromise and joined the Republican party on its formation. He was Secretary of State under Grant from 1869 to 1877, signing, as one of the commissioners, the Washington Treaty of 1871, and carrying through the settlement of the "Alabama" question. **Died at Garrison, Putnam co., N. Y., Sept. 7, 1893.**

FISH, NICHOLAS, an American military officer; born in New York City, Aug. 28, 1758, studied law; joined the Continental army and was an aide on the staff of John Morin Scott early in

1776; was promoted major of the 2d New York Regiment in November of that year; participated in the battles at Saratoga in 1777; led a corps of light infantry in the battle of Monmouth; and otherwise distinguished himself during the Revolutionary War. He was made adjutant-general of New York in 1786; supervisor of United States revenue in 1794, and president of the New York State Cincinnati Society in 1797. He died in New York City, June 20, 1833.

FISH CULTURE, or **PISCICULTURE**, the artificial propagation of fish to offset the destructive effect of fisheries. The art of fish fertilization is comparatively new. In 1763 Stephen L. Jacobi of Westphalia, Germany, devised the process now in use of stripping the ova from the female fish and mixing them with milt taken from the male. In 1850 the first government fish culture station was established in Huningue, Alsace. In the United States the art has made greater progress than in Europe. Dr. Garlick in 1865 began the propagation of brook trout, and New Hampshire imported salmon eggs from Canada to hatch in the waters of that State. Since then the various States have one by one taken up the art, till now nearly all have regularly appointed fish commissioners. Of the numerous inventions along this line, the most important is McDonald's fish-hatching jar, which keeps the eggs in motion, and automatically separates the dead fish from the living.

The United States Commission of Fish and Fisheries was established by joint resolution of Congress, approved Feb. 9, 1871. It is placed in charge of a Commissioner of Fish and Fisheries, who is required to be a person of scientific and practical acquaintance with the fish and fisheries of the sea, coast, and inland waters. Reports are made annually to Congress. The scope of the work of the commission covers (1) the propagation of useful food fishes, including lobsters, oysters, and other shellfish, and their distribution to suitable waters; (2) the inquiry into the causes of decrease of food fishes in the lakes, rivers, and coast waters of the United States, the study of the waters of the coast and interior in the interest of fish culture, and the investigation of the fishing grounds of the Atlantic, gulf, and Pacific coasts, with the view of determining their food resources and the development of the commercial fisheries; (3) the collection and compilation of the statistics of the fisheries and the study of their methods and relations. See FISHERY.

FISHER, ANDREW, High Commissioner of Australia in England. He was born at Crosshouse, Kilmarnock, in 1862, and went to Queensland, Australia, in 1885. He entered the Queensland Parliament in 1893, and later became Minister of Railways in the Dawson Ministry. He represented Wide Bay in the Commonwealth Parliament for the first fifteen years of the Parliament. In 1904 he became Minister for Trade and Customs, Commonwealth of Australia; and in 1907 leader of the Federal Parliamentary Labor party. In 1908-1909 he was Prime Minister of Australia; in 1909-1910 leader of Federal Opposition, and in 1910-1913 and 1914-1915 Prime Minister. In 1915 he resigned office as Prime Minister to represent Australia in London.

FISHER, DOROTHY CANFIELD (DOROTHEA FRANCES CANFIELD FISHER), an American writer, born in Lawrence, Kan., in 1879. She graduated from the Ohio State University in 1899, and took post-graduate courses at Columbia. In 1907 she married John Redwood Fisher. She traveled and studied extensively in Europe. She wrote several books on educational subjects. Her chief fame, however, rests on her works in fiction, which include "The Squirrel-Cage" (1912); "Hillsboro People" (1915); "The Bent Twig" (1915); "Fellow-Captains" (1916); "The Day of Glory" (1919); "The Brimming Cup" (1919). During the World War she spent three years in France engaged in war work.

FISHER, GEORGE PARK, an American educator; born in Wrentham, Mass., Aug. 10, 1827; was graduated at Brown University in 1847; studied theology at the Yale Divinity School; at Andover, and in Germany; was Professor of Divinity in 1854-1861, and subsequently of Ecclesiastical History at Yale. He was the author of "Essays on the Supernatural Origin of Christianity," "History of the Reformation," "The Grounds of Historic and Christian Belief," "Manual of Christian Evidences," "Colonial History of the United States." He died in 1909.

FISHER, HARRISON, an American illustrator; born in Brooklyn, N. Y., in 1876. He was educated in San Francisco. He was recognized as one of the most talented of American illustrators, and his work appeared in the leading magazines. He made illustrations for "The Market Place," by Harold Frederic; "The Eagle's Heart," by Hamlin Garland; and other books.

FISHER, HERBERT ALBERT LAURENS, a British legislator. He

was born in London in 1865 and was educated at Winchester and Oxford University. He divided his time between politics and educational subjects, and in 1912 became a member of the Commission on the Public Services of India. In 1916 he was elected to represent the Hallam Division of Sheffield in Parliament, and in the same year became President of the Board of Education. His publications include: "The Mediæval Empire," "Studies in Napoleonic Statesmanship," "A Political History of England," "Bonapartism," "Life of F. W. Maitland," "The Republican Tradition in Europe," "Political Unions," "Napoleon Bonaparte," with contributions to many magazines.

FISHER, IRVING, an American economist; born in Saugerties, N. Y., in 1867. He graduated from Yale in 1888 and afterward studied in Berlin and in Paris. In 1890 he joined the faculty of Yale and became successively assistant professor and professor of political economy, the latter in 1898. From 1896 to 1910 he was editor of the "Yale Review." He was president and director of many important commissions, including the Citizens' Commission on War-Time Prohibition, and the National Conservation Commission, appointed by President Roosevelt. In 1917 he was chairman of the board of scientific directors of the Eugenics Record Office. During the campaign of 1920 he was active in support of the League of Nations as a campaign issue. He wrote "The Nature of Capital and Income" (1906); "The Rate of Interest" (1907); "The Purchasing Power of Money" (1911); "Stabilizing the Dollar" (1919). He also contributed numerous articles to magazines.

FISHER'S HILL, a lofty eminence, about 20 miles S. of Winchester, Va., between the Massanutten and North Mountains, and with its base washed by a branch of the Shenandoah. This place was the scene of a smart action, Sept. 22, 1864, between a National force under General Sheridan, and one of Confederates commanded by General Early, in which the latter was defeated with the loss of about 1,000 men killed and wounded, over 1,000 prisoners, and 16 guns. Among the killed were Generals Rhodes and Goodwin. The Union casualties numbered about 3,000.

FISHERY, the business or occupation of catching fish. The word fishery is popularly used in a comprehensive sense; not merely is there a herring fishery, a salmon fishery, a cod fishery, a pilchard fishery, etc., for catching these genuine fishes, there is a whale fishery for harpooning the mammals called whales, a crab and lobster fishery for catching those crustaceans, an oyster fishery for obtaining those testaceaus mollusks, as well as a seal fishery for capturing those animals. The great locality for the whale fishery is the polar regions of the N. and S. hemispheres, that for the cod fisheries the banks of Newfoundland, that for the herring fishery the entire E. coast of this country and the coasts of Great Britain and Ireland, that for the salmon fishery the rivers of North America and Great Britain. The practice of salting fish was known to the Egyptians about 1351 B. C., or even earlier. Herrings were largely caught in Scotland, as early as the 9th century. The injudicious interference of the government drove some of the fishermen to Holland. The fisheries of the United States are superintended by the federal Bureau of Fisheries which is a division of the Department of Commerce. There are also similar bureaus in many States, and extensive hatcheries for propagation of various species with which to stock our waters have been established. In 1919 the number of vessels employed in the fishery industry of the United States was estimated at 8,280 of 228,000 tons; the number of persons employed at 188,000; the capital invested at $142,140,000; and value of products at $110,992,000, about one-fifth of the total value of fishery products throughout the world.

FISK, CLINTON BOWEN, an American soldier and publicist, born in 1828 at Greigsville, N. Y. For some time he was engaged in business in Michigan and then removed to St. Louis. He entered the Union army at the outbreak of the Civil War and in 1865 was brevetted major-general. He devoted the remainder of his life chiefly to the interests of the negro race and was assistant commissioner in the Freedmen's Bureau. He was instrumental in founding Fisk University. In 1884 he left the Republican party and joined the temperance movement. He was Prohibition candidate for Governor of New Jersey in 1886, and for President of the United States in 1888. He died in 1890.

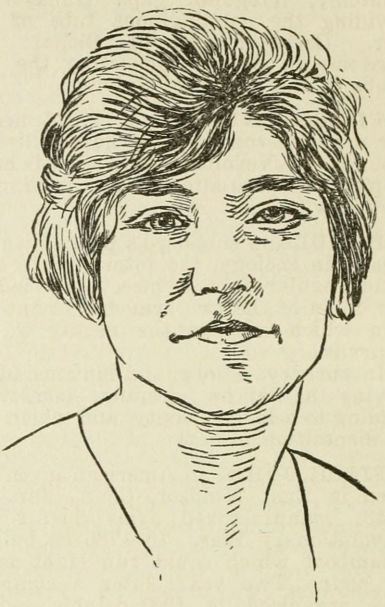
FISK, FRANKLIN W., an American educator; born in Hopkinton, Vt., in 1820; was graduated at Yale University in 1849; taught there awhile; then became Professor of Rhetoric in the Seminary of Beloit, Wis. He was called to the Chicago Theological Seminary when that school was founded in 1859. Subsequently he was president of the seminary till 1900 when he resigned. He died in Chicago, Ill., July 4, 1901.

FISK UNIVERSITY, a coeducational institution for colored persons in Nashville, Tenn.; founded in 1866 under the auspices of the Congregational Church.

FISKE, BRADLEY ALLEN, an American naval officer; born in Lyons, N. Y., June 13, 1854; was appointed a cadet midshipman in the United States navy Sept. 24, 1870; became a lieutenant Jan. 26, 1887, and a lieutenant-commander March 3, 1899. He invented a boat detaching and attaching apparatus for warships in 1877; the first electric ammunition used in the navy in 1888; electric gun training apparatus and electric steering gear the same year; range and position finders in 1889; improvements of the range finder and electric steering gear in 1895; and an electrical apparatus for transmitting the orders of a ship's commander from the deck bridge to the engine room in 1896; and was attached to the Naval Bureau of Ordnance from 1895. In 1901 he was appointed a lieutenant-commander and, by promotion, a rear-admiral in 1911. He assisted in naval operations 1913-1915, retiring in the latter year. Was awarded Cresson gold medal by French Institute in 1893, Gold Medal by U. S. Naval Institute for prize essay "American Naval Policy" (1905); author "Electricity and Electrical Engineering," "Electricity in Theory and Practice," "War Times in Manila" (1915). He published "Electricity and Electrical Engineering."

FISKE, JOHN, an American historian; born in Hartford, Conn., March 30, 1842. He was graduated at Harvard College in 1863, and in 1865 took his degree in law, but never practiced. He was for a while lecturer on philosophy at Harvard, and in 1872-1879 assistant librarian. He was author of "Myths and Myth-Makers" (1872); "Outlines of Cosmic Philosophy" (2 vols. 1875), his principal work, in which he gives an exposition of the philosophy of natural evolution; "The Unseen World" (1876); "Darwinism" (1879); "The Idea of God" (1885). On phases of American history, he wrote: "American Political Ideas" (1885); "The Critical Period of American History, 1783-1789" (1888); "The Beginnings of New England" (1889); "The American Revolution" (3 vols. 1891); "Discovery of America" (2 vols. 1892). He died in Gloucester, Mass., July 4, 1901.

FISKE, MINNIE MADDERN, an American actress, born in New Orleans in 1865. She took a child's part on the stage when but three years of age, and at the age of twelve, played leading rôles in old women's parts. Three years later she became a star under the name of Minnie Maddern. She became one of the most eminent artists on the American stage. Among the most successful plays in which she appeared were "Tess of the D'Urbervilles," "Becky Sharp," and plays of Ibsen.



MINNIE MADDERN FISKE

FISMES, FRANCE, a town in the department of the Marne, situated at the juncture of the Vesle and the Ardre, seventeen miles N. W. of Rheims. Shortly after the invasion of northern France by the Germans, in the summer of 1914, Fismes was occupied by them and used as a supply depot. They were finally ousted by the American troops, who entered the town on Aug. 4, 1918. Pop. about 3,000.

FISSURE, in ordinary language, a cleft; a narrow opening made by the parting or opening of any substance; a crack. In botany the opening of seed-vessels, anthers etc. In heraldry, the fourth part of the bend sinister. In geology, a crack in the strata, produced by volcanic or earthquake action, subsidence, or any other cause. Fissure of Glaser: In anatomy, a fissure in the ear, separating the upper margin of the tympanic plate from the glenoid fossa. Fissure of Rolando: In anatomy, a fissure separating the parietal from the frontal lobe of the cerebrum. Fissure of Sylvius: In anatomy, a fissure or deep cleft commencing on the under sur-

face of the brain, and passing transversely outward to the lateral surface of the hemisphere, where it divides into two limbs. Fissures of Santorini: In anatomy, irregular gaps transversely dividing the cartilaginous tube of the ear. Great fissure of Bichat: In anatomy, a fissure connecting the two limbs of the fissure of Sylvius.

FISSURE NEEDLE, a spiral needle for drawing together the gaping lips of wounds. By revolution, the point is made to pierce the lips alternately, carrying its thread with it.

FISTULA, a shepherd's pipe; a water-pipe. In zoölogy, the intermediate subquadrangular pipe, in insects, formed by the union of the two branches of the anthia which conveys the nectar to the pharynx.

In surgery, a long and sinuous ulcer, having a narrow opening, sometimes leading to a larger cavity, and which has no disposition to heal.

FITCH, JOHN, an American inventor; born in East Windsor, Conn., Jan. 21, 1743; manufactured arms during the Revolutionary War. In 1786 he built a steamboat which could run eight miles an hour. Two years later a company was organized in Philadelphia, which built a steampacket that ran on the Delaware river for about two years, when the company failed. He wrote a history of his work on the steamboat. He died in Bardstown, Ky., July 2, 1798.

FITCH, WILLIAM CLYDE, an American playwright and author; born in New York, May 2, 1865. He was educated at Hartford, Conn., and Amherst College, Amherst, Mass. He wrote a number of successful plays, among them "Beau Brummell" and "Bohemia," "The Climbers," "The Way of the World," "The Girl and the Judge," etc. He is also the author of "The Knighting of the Twins, and Ten Other Tales" and "Some Correspondence and Six Conversations." He died Sept. 4, 1909.

FITCHBURG, a city and one of the county-seats of Worcester co., Mass., on the New York, New Haven, and Hartford, railroad; 50 miles N. W. of Boston. It comprises the villages of Traskville, Rockville, South Fitchburg, West Fitchburg, and Fitchburg Center. It contains a public library, high school, electric street railroad, electric lights, several National and savings banks, and a number of daily and weekly newspapers. There are manufactories of pianofortes, tools, machinery, paper, saws, electrical apparatus, steam engines, bicycles, firearms, cotton, and woolen goods, etc. Pop. (1910) 37,826; (1920) 41,013.

FITZGERALD, a city of Georgia, the county-seat of Ben Hill co. It is on the Seaboard Air Line, the Atlanta, Birmingham and Atlantic, and the Ocilla Southern railroads. Its industries include cotton and oil mills, fertilizer plants, and railroad repair shops. It has a large trade in timber and turpentine. Pop. (1910) 5,795; (1920) 6,870.

FITZGERALD, EDWARD, LORD, an Irish patriot; born near Dublin, Ireland, in 1763. He was a son of the first Duke of Leinster. He distinguished himself for intrepidity as aide-de-camp to Lord Rawdon in the latter part of the American Revolutionary War, and was severely wounded in the battle of Eutaw Springs. When the French Revolution broke out, he supported its principles, and in 1793 hastened to Paris. Here he married Pamela, the daughter, it is said, of Louis Philippe Joseph, the Duke of Orleans, and Madame de Genlis. On his return to Ireland, Fitzgerald was desirous of effecting a separation of that country from England, and induced the French Directory to furnish him with a fleet and troops. A landing was attempted on several occasions, but without success, owing to the vigilance of the English channel fleet; and Fitzgerald was seized, tried, and condemned to death. He died of his wounds before the time fixed for his execution, 1798. His wife had been educated with the daughters of the Duke of Orleans, by Madame de Genlis, and married a second time, Mr. Pitcairn, the American consul at Hamburg.

FITZGERALD, EDWARD, an English poet; born in Bredfield House, near Suffolk, England, March 31, 1809. His father, John Purcell, assumed the name Fitzgerald, which was his wife's family name. His writings are for the most part remodeled translations of poems in other languages; among them are: "Six Dramas from Calderon" (1853), and two more ("The Mighty Magician" and "Such Stuff as Dreams Are Made of") subsequently "The Rubáiyát of Omar Khayyám" (1859), a translation that won for Fitzgerald great celebrity; a version of the "Agamemnon" of Æschylus; and versions of other Greek and Persian poets. He died in Merton, Norfolk, England, June 14, 1883.

FITZROY, two Australian rivers, one in Western Australia and one in Queensland. The first rises in the King Leopold Mountains and after a westerly course of about 300 miles enters into King Sound on the Indian Ocean. It is navi-

gable for about 100 miles. The Queensland river is formed by the junction of the Mackenzie and the Dawson rivers. It flows in an easterly direction into Keppel Bay on the Pacific coast. It is navigable for about 40 miles from its mouth.

FIUME, a city on the west coast of the Adriatic, forty miles S. E. of Trieste. It is a large, modern city, with buildings of large size, covering eight square miles, and with a population of 50,000, comprising Slavs and Italians. Fiume was, before the World War, under Hungarian sovereignty, and constituted the only seaport of the kingdom, for which reason much money was spent in its development. Its exports averaged $35,000,000 a year, and its imports only slightly less. It was also of first-class importance as an industrial center, there being established here large manufacturing plants for the production of Whitehead torpedoes, paper, petroleum, and flour. Extensive fisheries were carried on in the Adriatic with Fiume as their center.

After the collapse of the Austro-Hungarian Empire, in 1918, the city fell into the hands of the Jugoslavs, who claimed it on the ground that it was indisputably situated in Slav territory. This claim, however, Italy was disposed to contest, contending that the majority of the population within the city was Italian, and desired to be part of Italy. A compromise was finally effected, both parties agreeing that Fiume should become a free city. Suddenly, on Sept. 12, 1919, it was announced that a force of Italian soldiers, under the leadership of Captain Gabriele d'Annunzio, the famous poet and writer, who had distinguished himself as an aviator during the war, had entered the city and taken possession by armed force, declaring that the city should remain Italian. This action was not only without the sanction of the Italian Government, but occupation was continued in spite of the orders of the Premier that the Italian soldiers within the city should withdraw. A threat was even made to send other Italian forces against the mutineers. D'Annunzio's popularity, however, gave him a moral force stronger than the military force of the Government, or even of that of the Allies, for, in November, 1920, he was still in possession. A treaty signed by Italy and Jugoslavia on Nov. 12, 1920, made Fiume a free city.

FIVE FORKS, a locality near Dinwiddie Court-house, Va. Here, on April 1, 1865, a severe engagement was fought between the National troops and the Confederates, the former under the command of General Sheridan, and the latter under that of General Lee. After several hours' heavy fighting, the Confederates retreated with a loss of a large number of killed and wounded, 5,000 prisoners, and several guns. The National loss was about 1,000 men, including General Winthrop, who was killed.

FIVES, an English game at ball, in which the ball is struck against a wall. It is played either in close or in open courts, of various shapes and proportions. The game is known as hand-fives or bat-fives, according as the ball is struck by the open hand or a small wooden bat. Also the first, or hand, as having five fingers. Also a disease in horses, resembling the staggers, and consisting of an inflammation of the parotid glands; written also vives.

FIXED STAR, in pyrotechnics, a composition introduced into a rocket case and emitting fire at five holes, to represent a star. The composition is niter, sulphur, gunpowder meal, and antimony.

In astronomy, fixed stars are those which till lately were supposed absolutely to maintain their relative positions toward each other in the sky, and are still admitted to do so very nearly. They are contra-distinguished from planets or "wandering stars." The number of fixed stars is infinitely great, especially in the part of the heavens called the Milky Way (see GALAXY). From a remote period of antiquity they have been grouped into constellations (see CONSTELLATION). They shine by their own light, and probably are suns each one surrounded by planets of its own. Some stars are periodic, and vary in brightness, others disappear and come again. There are double and triple stars, gravity operating on their movements.

FIXTURE, in law, a term applied to things of an accessory nature annexed to houses or lands, so as to become part of the realty. The annexation must be by the article being set into or united with the land, or with some substance previously connected therewith. Thus a shed built upon a frame not let into the earth, is not a fixture. Machines and other things erected for the purposes of trade are not fixtures, if they can be removed without material damage to the property. Fixtures may not be distrained upon.

FLAG, an ensign or colors; a piece of cloth, either plain or colored, and having certain figures, lines, or marks painted or worked on it; a banner indicating nationality, occupation, or intelligence. Flags of nationality are standards, ensigns, pennants (pendants), jacks. Flags of occupation indicate serv-

ice, as war, merchant, dispatch, pilot, yacht-squadron, liners, etc. Flags of intelligence are of various colors and of three shapes: square, pointed, and burgee. They are used in various combinations to transmit messages according to a printed or secret code. The standard (military or naval) is a war flag. The ensign is national. The idea of standards originated with the Egyptians, at an early age. The Crusaders added the cross to their banners. The union of the three crosses of St. George, St. Andrew, and St. Patrick, marks, first the union of England and Scotland into the kingdom of Great Britain; and, then, this kingdom with Ireland. This is termed the Great Union Flag of Great Britain, and was brought by the colonists to America. When the 13 colonies began to feel the pressure of British rule they placed upon their banners a rattlesnake, cut in 13 pieces, representing the 13 colonies, with the motto: "Join or die." When these colonies became more united in their purpose of resistance to British tyranny, they placed upon their flag a well-formed rattlesnake in the attitude of about to strike, with the motto, "Don't tread on me."

The next form of the United States flag was our present standard, the Stars and Stripes. On June 14, 1777, the Continental Congress resolved that the flag of the United States be 13 stripes, alternate red and white, and that the union be 13 white stars on a blue field, representing "a new constellation." On Jan. 13, 1794, by an act of Congress, the flag was altered to 15 red and white stripes, and 15 stars. On April 4, 1818, Congress again altered the flag by returning to the original 13 stripes and 15 stars, as the adding of a new stripe for each additional State would soon make the flag too unwieldy. The new star is added to the flag on July 4, following the admission of each State into the Union.

Also, the uneven end of an uncut tuft of hair on a brush. To strike or lower the flag: To pull the flag down in token of respect, surrender, or submission. To dip the flag: To lower it for a brief space as a salute or mark of respect. To hang the flag half-mast high: To raise it only halfway up the staff as a token of mourning.

FLAGELLANTS, a Christian sect which arose in 1260 at Perugia, called by the French *Perouse*, and spread throughout and beyond Italy. Its adherents, who saw a plague raging, and moreover expected the world speedily to terminate, believed that they could propititate the Divine Being by walking in procession with only a cloth tied round them, and flagellating their bare shoulders with whips which they carried. At first they were noted for sanctity, and made many converts, but doubtful characters beginning to join their ranks, they fell into disrepute, and were restrained from their processions by the civil and ecclesiastical authorities, when the sect gradually died away. The terror produced by the dreadful disease called the black death, which destroyed many millions of people in Europe between 1348 and 1351, produced a revival of the flagellation mania, which spread over most of Europe. In 1349 Clement VII. declared the Flagellants heretics and took steps to repress them. In 1414 an effort was made in Thuringia to revive them anew, but the burning alive of their leader, Conrad Schmidt, and 90 of his followers led to the gradual decline of the sect.

FLAGEOLET, in music, a small pipe with a mouth-piece inserted in a bulb (hence the derivation of the name from the same root from which the word flagon comes), producing a shrill sound, similar but much softer in quality than that produced from the flauto piccolo. It was formerly employed in the orchestra. Also the tone produced from a violin by lightly pressing the bow near the bridge upon lightly touched strings, is called flageolet or flute tone.

FLAGG, JAMES MONTGOMERY, an American artist and illustrator, born in Pelham Manor, N. Y., in 1877. He was educated privately and in the New York public schools. He studied at the Art Students' League in New York, and in Paris. In 1890 he began his work as an illustrator, and within a few years his work appeared in nearly all the important magazines. He also illustrated several well-known books. He became well known as a painter of portraits. He wrote and illustrated several books, including "Yankee Girls Abroad" (1900); "Why They Married" (1906); "The Mystery of the Hated Man" (1916). During the World War he was appointed State military artist of New York and designed 45 war posters.

FLAGLER, HENRY M., an American capitalist, born in Canandaigua, N. Y., in 1830. For several years he acted as a clerk in a country store, and was later a manufacturer of salt in Michigan. He came in association with John D. Rockefeller in the oil business, and became a member of the Standard Oil Co. He was vice-president and practical head of this corporation until 1908,

and was a director until 1911. He was interested in the development of the east coast of Florida and built several of the largest hotels at Palm Beach, St. Augustine, and other resorts. He was also instrumental in the building of the Florida East Coast Railway and was a director in many other important railroads and financial institutions. He died in 1913.

FLAMBOROUGH HEAD, a bold promontory of England, on the Yorkshire coast, projecting a considerable distance into the sea; lat. 54° 7′ N., lon. 0°5′ W. This is at once the most striking and most celebrated headland on the E. coast of Great Britain, rising 450 feet sheer above the sea, having on its summit a lighthouse, 214 feet high, showing a revolving light. For the battle of Flamborough Head, see JONES, PAUL.

FLAME, in chemistry, a shell of incandescent matter surrounding a mass of combustible vapor. To produce flame it is therefore necessary that the burning body should be capable of volatilization just below the temperature at which it undergoes combustion. Charcoal or iron will burn with a steady glow, more or less luminous according to the medium in which they are burnt, neither of these substances being susceptible of volatilization at the temperature at which combustion takes place. A piece of wood or paper, on the contrary, burns with a large luminous flame, in consequence of the combustible matter of which it is composed rising in vapor or becoming converted into mixed gases at the temperature required for kindling the substance. Flame is, in fact, produced whenever a continuous supply of inflammable vapor or gas is made to combine with a supporter of combustion, such as the atmosphere, at a sufficiently elevated temperature to cause ignition. The heating power of a flame is in direct proportion to the energy of the chemical action that takes place, those flames being hottest and least luminous which proceed from gases containing no solid particles, as in the case of a mixture of oxygen and hydrogen in the proportion necessary to form water, which is one of the hottest flames we have at our command. The most luminous flames are from gases which contain just sufficient solid matter to give the maximum of incandescence without any of its particles passing away unburnt. Olefiant gas and the ordinary coal gas are good examples of this as compared with the oxyhydrogen flame, which contains no solid matter on the one hand, and the flame of pitch or turpentine on the other, which contains too much carbon, the excess passing off in the form of smoke. The flames used for illuminating purposes are all produced by the combustion of compounds containing carbon and hydrogen. Besides the proper proportions of gaseous and solid matter contained in illuminating substances, care must be taken to regulate the supply of air. The ARGAND LAMP (*q. v.*) and chimney, as applied to gas and camphene, are examples of this.

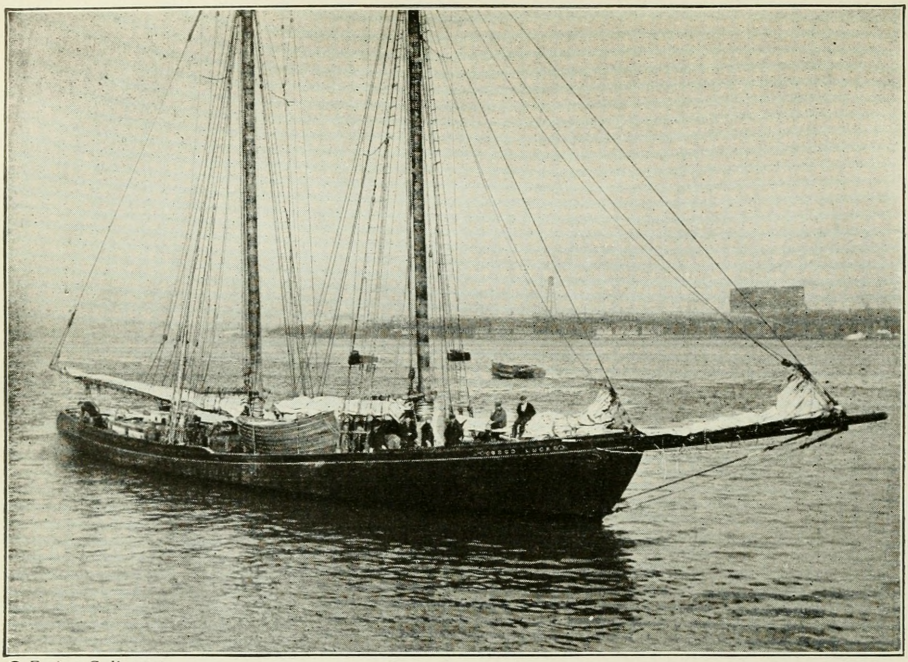
Flame has three distinct parts: The central or non-luminous part, where there is no combustion, but where the carbon begins to separate from the hydrogen; the second or luminous part, where the carbon is for a moment free and heated to a white heat; and the exterior part, which is the hottest, and where the combustion is complete. It is easy now to understand of what importance is the form of the burner, and how it may be modified accordingly as we desire light or heat. If we wish light the carbon must be protected for some seconds from contact with the air; but not long enough to allow it to pass off unconsumed. If, on the contrary, heat is desired, the carbon must be burned as quickly as possible. The German chemist Bunsen constructed a gas burner after this theory, which is perfectly adapted to the production of heat. Every mixture of gases requires a certain temperature to inflame it; and if the temperature be not reached, the mixture does not take fire; we may thus cool down a flame so much that it goes out by placing over it a small coil of cold copper wire, whereas if the coil be previously heated, the flame will contine to burn. If a piece of wire gauze be held close over a jet of gas and the gas lit, the gauze may be removed several inches above the jet, and yet the inflammable gas below will not take fire, the flame burning only above the gauze. See SAFETY LAMP.

FLAME THROWERS, or **FLAMMENWERFER**, were used by the Germans in the World War as a weapon of attack. They consisted of a cylindrical vessel of steel, approximately two feet long and fifteen inches in diameter, divided internally into two compartments. The upper compartment contained nitrogen under a pressure of twenty-three atmospheres, while the lower was filled with inflammable oil. The cylinder was strapped to the back of the operator, and toward the base was affixed a valve to which was attached a short length of flexible hose ending in a nozzle. On opening the valve the oil was forced out under pressure and moved an automatic friction lighter which ignited the oil, thus producing a spray of "liquid



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A SEAL ROOKERY ON ST. PAUL, ONE OF THE PRIBILOF ISLANDS, WHICH BELONG TO ALASKA



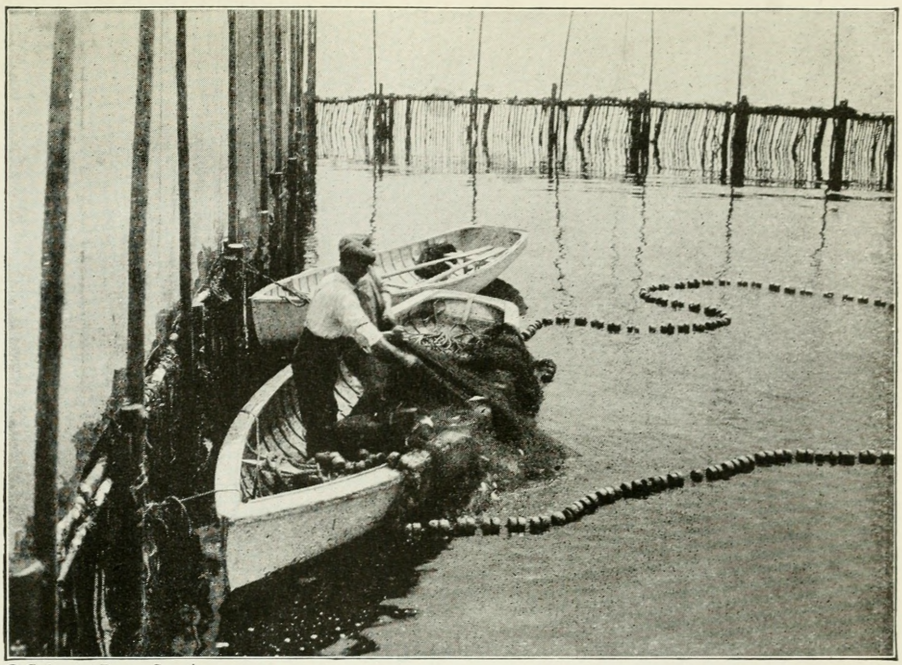
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A FISHING BOAT LEAVING BOSTON HARBOR



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HOISTING A TUNA FISH FROM A SPILLER TRAP INTO A FISHERMAN'S SMACK



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PURSING THE SEINE NET FOR "SARDINE" FISHING IN THE NEW BRUNSWICK FISHING GROUNDS



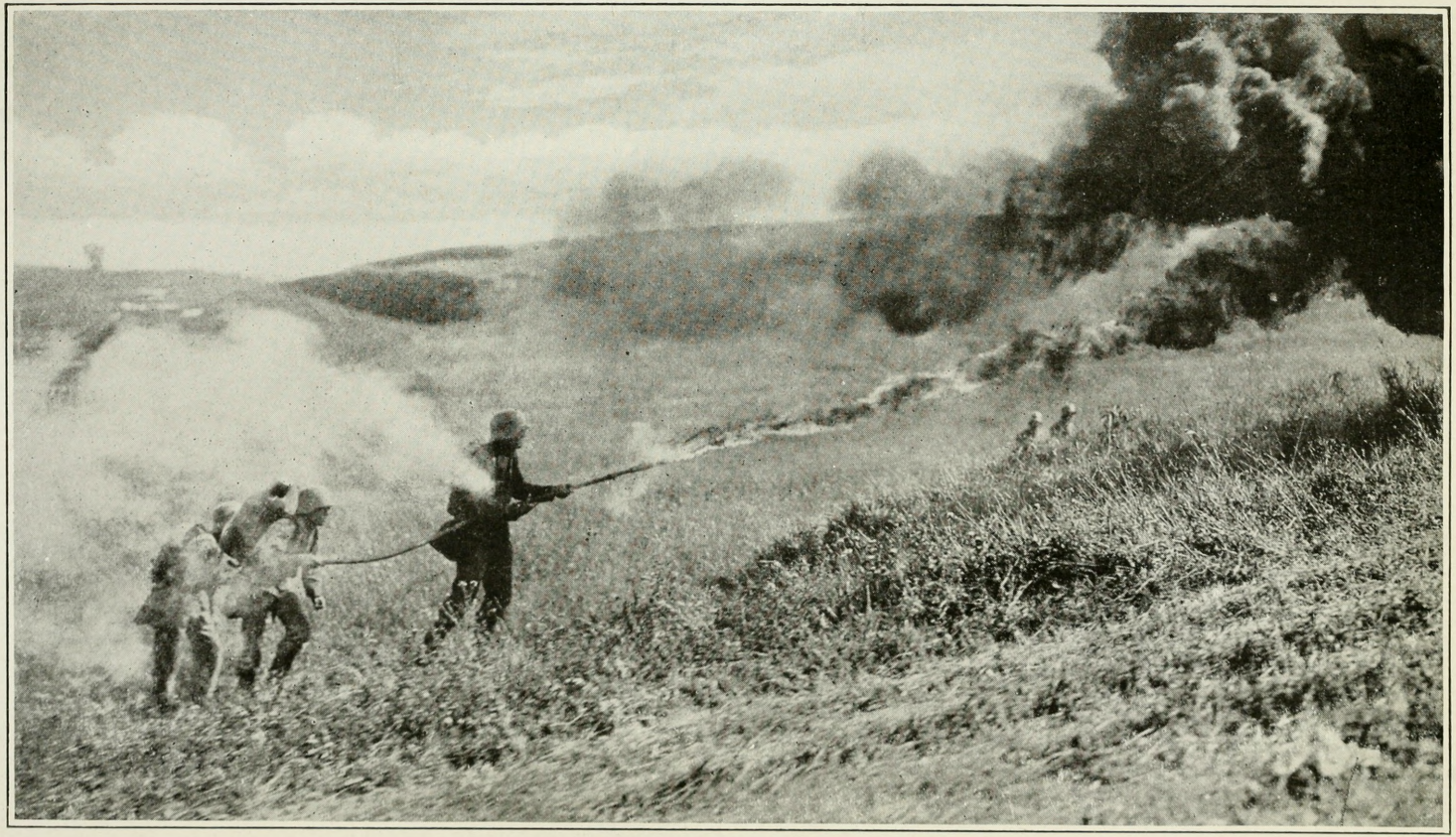
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A CATCH OF HERRING, NEW BRUNSWICK FISHING GROUNDS

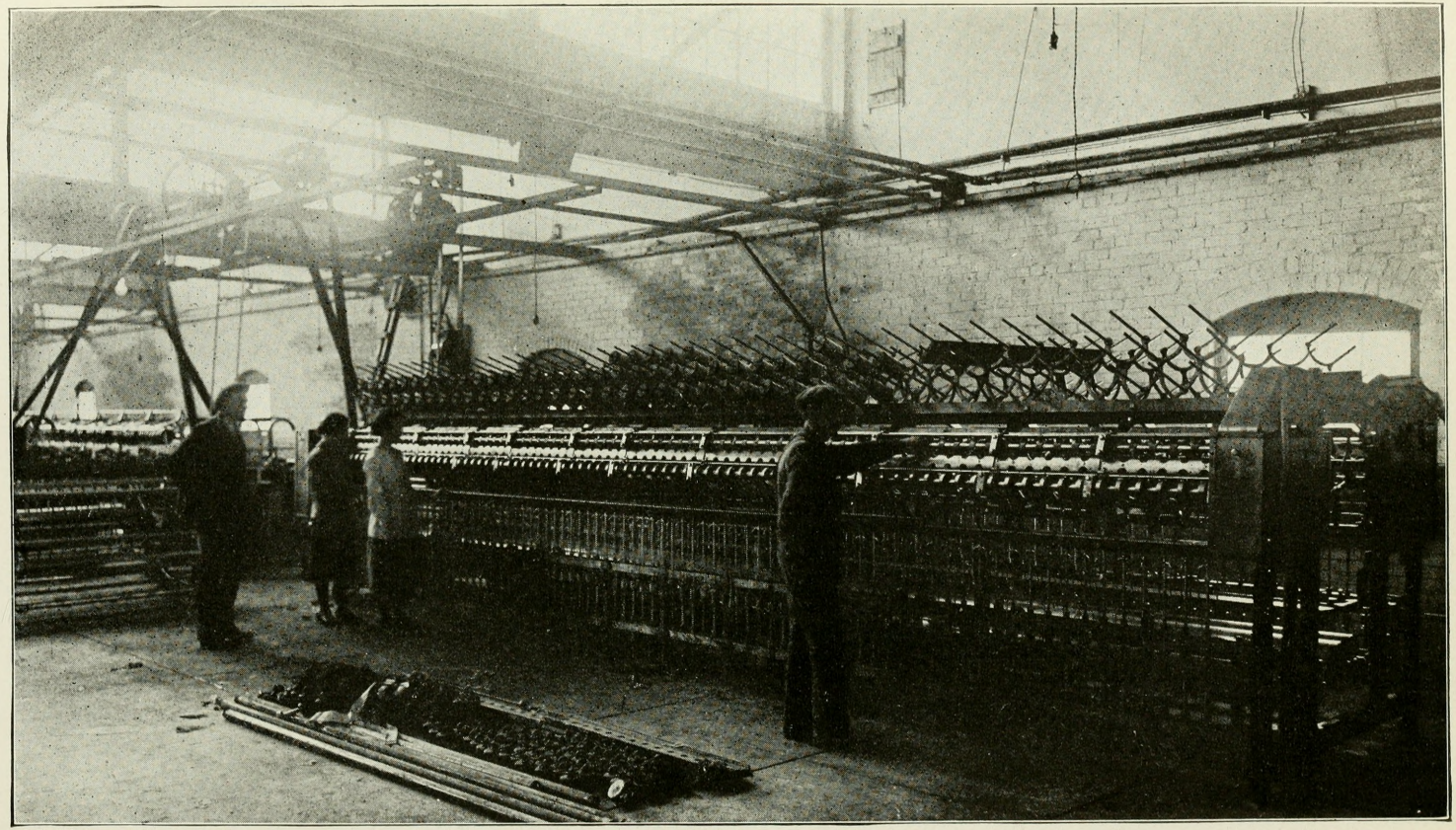


Photo by Ewing Galloway

A FLEET OF OYSTER SCHOONERS LEAVING BIVALVE, N. J., TO FISH IN THE DELAWARE RIVER

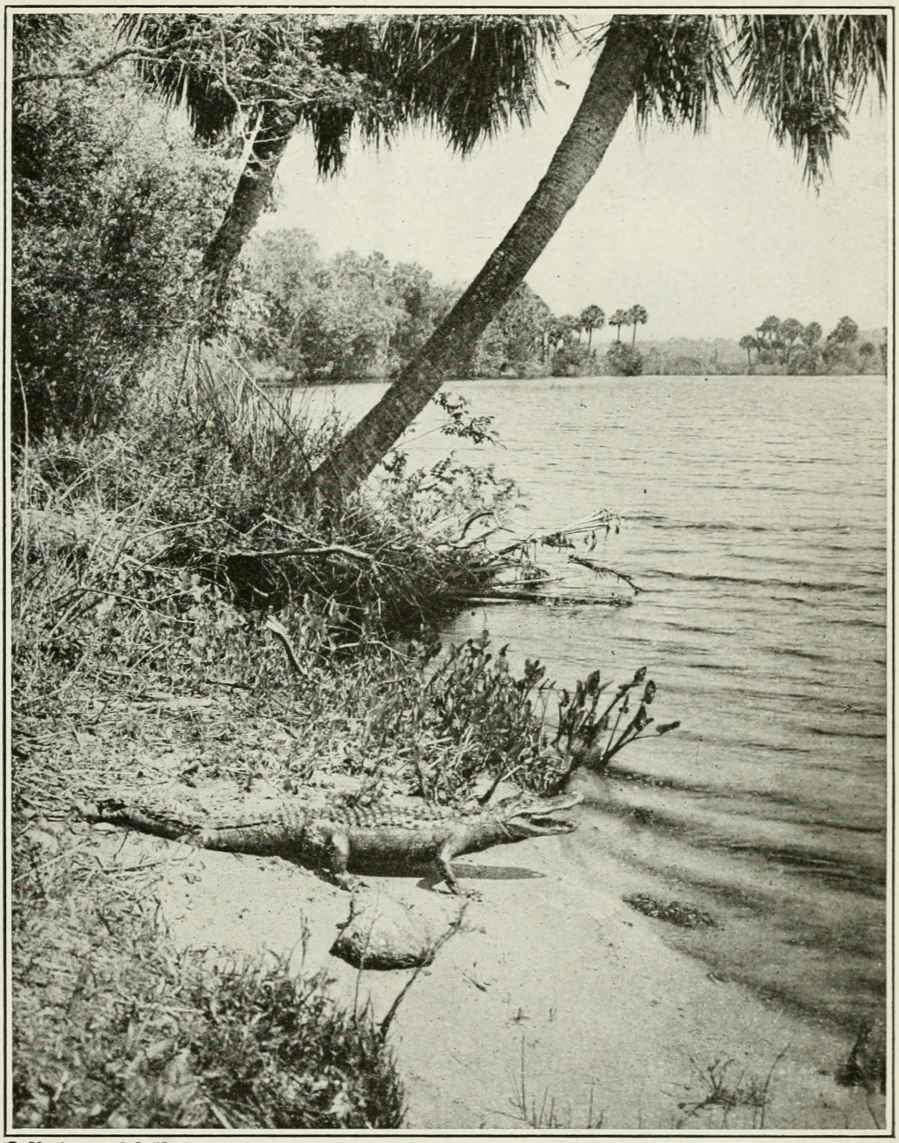


FLAMMENWERFER OR FLAME-THROWER IN USE BY GERMANS ON THE WESTERN FRONT OF THE WORLD WAR



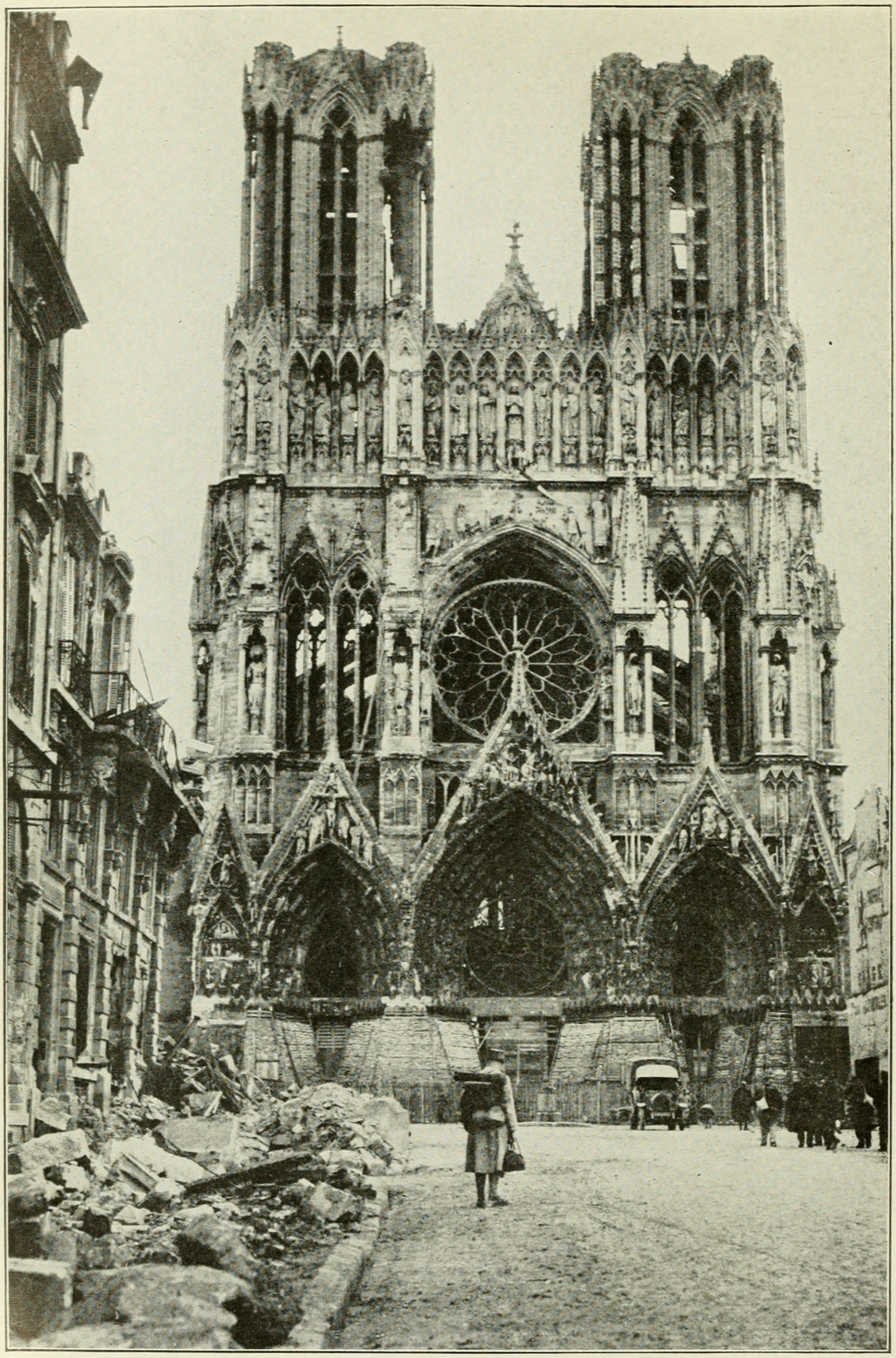
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FLAX SPINNING IN A CANADIAN MILL



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A VIEW ON THE TOMOKA RIVER, FLORIDA, SHOWING TYPICAL VEGETATION AND AN ALLIGATOR IN THE FOREGROUND

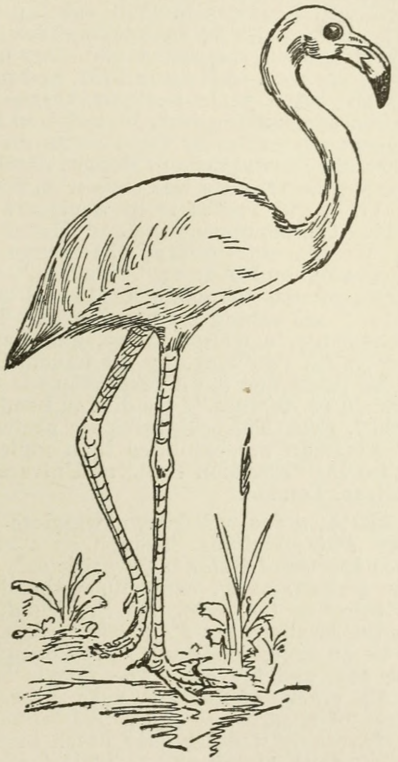


©*American Photo Service*

THE CATHEDRAL OF NOTRE DAME AT RHEIMS, AT THE CLOSE OF THE WORLD WAR

fire," which was directed toward the enemy. The oil was a carefully compounded mixture of light and heavy components, the lighter portion being either gasoline or ether, and the heavier portion higher boiling petroleum oils.

FLAMINGO, a bird, *Phœnicopterus ruber*, which has very long legs, and in other respects so much resembles one of the grallatores (waders), that it was long classed with them. But Swainson pointed out that its feet have the webbed toes of the duck, and the bill is a modification of a duck's bill. He therefore placed it with the natatorial (swimming)



FLAMINGO

birds. The plumage is rose-colored, the wing coverts red, the quill feathers of the wings black. It is about 3½ feet high. It is found in the S. of Europe, frequenting the seashore, and living on mollusca, crustacea, and smaller fishes. Also the genus *Phœnicopterus*, of which species exist in Europe, Asia, Africa, and South America. They are gregarious and migratory, moving in large flocks.

FLAMMARION, CAMILLE (flä-mä-rē-ôn'), a French astronomer, writer on descriptive astronomy, and "astronomical novelist"; born in Montigny-le-Roi, Haute-Marne, France, Feb. 25, 1842. He was designed by his parents for the Church, but went over to science, and by a long course of writings of a more or less popular character made his name widely known. "The Plurality of the Inhabited Worlds" (1862); "Celestial Wonders" (1865); "The Atmosphere" (1872); "Urania" (1889); "The Planet Mars and Its Habitability" (1892); "Popular Astronomy" (1894); and "Lumen" (1897), "Thunder and Lightning" (1906), "Mysterious Psychic Forces" (1907), etc., are among his best known works.

FLANDERS, the name of a very interesting and early civilized portion of Europe, forming two contiguous provinces of Belgium, termed East Flanders and West Flanders, respectively, bounded on the N. W. by the North Sea, and inclosed on its other sides by the provinces of Antwerp, Zealand, South Brabant, Hainault, and the French department Nord. East Flanders is separated from West Flanders by a line running almost due S. from Sluys, a small town nearly opposite Flushing. Area, 1,158 square miles; pop. about 1,134,079. The surface is level in the N. part, while to the S. it consists of undulating plains. The soil is heavy loam, and highly fertile. Capital, Ghent.

West Flanders has a considerable coast-line, in the central part of which is the port of Ostend. This side faces the N., but the W. boundary of the province adjoins the French territory. Area, 1,249 square miles; pop. about 885,000. The surface is generally level, excepting the dunes, or sand-hills, on the coast. The soil is fertile and agriculture good. Capital, Bruges. For productions, manufactures, etc., and history, see BELGIUM.

FLANK, one of the two parts of the body which enable it to bend; the part of the side of an animal between the ribs and the hip. As a military term, either side of a body of troops; the extremities of a body of soldiers in line, or the sides of a column, being termed the right and left flanks respectively. In any defense work, it is applied to that part from which a fire may be directed against the side or flank of an attacking party. Thus, the flanks of a bastion are those parts of the rampart and parapet which connect its faces with the extremities of the curtains of the enceinte on either side of it. A fire from the flanks is effective in preventing an attacking party from effecting a lodgment at the foot of the curtain that

lies between them, which might be done with comparative ease and security if these portions of the work did not exist. A fire from the flanks of any bastion enfilades the ditch at the foot of the curtain. In architecture, the side of any building. In machinery, the straight part of the tooth of a wheel which receives the impulse. Flanks, in farriery, a wrench, strain, or other injury received by a horse in the back.

FLANNAGAN, JOHN, an American sculptor; born at Newark, N. J. He studied under Augustus Saint-Gaudens and in Paris. Among the most important works executed by him were the monumental clock in the Library of Congress; a bronze relief at the Newark Public Library; and a number of portrait busts and heads. He was awarded many medals for the excellence of his work, and was an associate of the National Academy and a member of the National Sculpture Society.

FLAT. In music, a character of the form *b*, which depresses the note before which it is placed, a chromatic semitone. Thus D*b* signifies a semi-tone below D natural. On keyed instruments the short keys are the representatives of these flats and sharps. An accidental flat is one which, though not occurring at the commencement of the staff, is inserted in any other part of it, and only affects the bar in which it is placed. A flat fifth is an interval of a fifth depressed by a flat.

FLATHEAD, or SALISH, INDIANS, in the State of Washington, a tribe inhabiting the region between lat. 48° and 50° N., and lon. 117° and 121° W. They are so named on account of a practice formerly prevalent among them, of flattening the heads of their infants by artificial means. The custom, it is said, has been abandoned by this tribe, though it still exists among several neighboring tribes, to whom the name of Flathead is not generally given. They are short of stature, and badly formed, with wide mouth, thick nose and lips, and large nostrils.

FLAUBERT, GUSTAV (flō-bar′), a French novelist; born in Rouen, France, Dec. 12, 1821. His greatest novel was his first, "Madame Bovary" (1857). He next wrote a historical novel, "Salammbo," the scene laid in the most flourishing period of Carthage; "The History of a Young Man" (1869)"; "The Temptation of St. Anthony" (1874), and "Three Stories" (1877). The posthumous novel "Bouvard and Pécuchet" (1881) is a satire on humanity in general. His comedy "The Candidate" (1874) failed on the stage. He died in Rouen, May 8, 1880.

FLAX BRAKE, a machine for removing the woody and cellular portion of flax from the fibrous. Also a machine for shortening flax staple to adapt it to be worked by a given class of machines.

FLAXMAN, JOHN, an English sculptor and draughtsman; born in York, England, July 6, 1755. His father was a figure-molder. The son, from his earliest years, exhibited and cultivated his talent for designing, and was also attracted by the picturesque conceptions of Greek mythology. He began to study at the Royal Academy in 1770, earning for some time a living by making designs for Wedgwood, the potter, and other persons. He went to Italy in 1787, and during the seven years he spent there, his wife accompanying him, he acquired the highest reputation by three series of designs, the illustrations to Homer, Æschylus, and Dante. He was chosen A. R. A. in 1797, and Professor of Sculpture in 1810. The monument to Lord Mansfield in Westminster Abbey, the group of "Cephalus and Aurora," "Psyche," the group of the "Archangel Michael and Satan," are among his best works. The monuments to Nelson Howe, and Reynolds in St. Paul's are by his hand. One of his latest and finest productions is the "Shield of Achilles." He died in London, Dec. 7, 1826. The sculptures and sketches of Flaxman are exhibited in a gallery, called the "Flaxman Hall," at University College, London.

FLEA, a too well-known wingless insect. *Pulex irritans.* Though, as a rule, each species of *Pulex* is parasitic only on one animal, as *P. canis* upon the dog, *P. talpæ* on the mole, and *P. hirundinis* on the swallow, yet *P. penetrans* is said to be an exception, and to prey on man, the dog, and the cat. The female lays in the cracks of floors or such places, a dozen of eggs, white and a little ciscous. In favorable weather they hatch in five or six days, giving exit to little footless larvæ, like small worms, first white, then reddish, which roll themselves in a circle or spiral, and move forward in a serpentine manner. In about 12 days they inclose themselves in a small silken shell, and become nymphs. After another 12 they come forth as perfect insects. The last brood of summer continues in the larval state all winter. The flea is incased in armor like a mediæval knight. It can leap 30 times its own height; it can draw with ease 80 times its own weight. A plant, Fleabane, has been said to destroy it.

In Scripture, the rendering of the

Hebrew word *parsh;* Sept. *psyllos;* Vulg. *pulex,* which is probably correct. The Hebrew word, according to Gesenius, is from an obsolete quadrilateral root, *parash* = to leap (1 Sam. xxiv: 14; xxvi: 20).

FLEECE, ORDER OF THE GOLDEN. See GOLDEN FLEECE.

FLEMISH SCHOOL, a school of painting highly recommended to the lovers of the art by the invention, or at least the first practice, of painting in oil. It has been generally attributed to John Van Eyck, in the beginning of the 15th century, who was, it is said, accustomed to varnish his distemper pictures with a composition of oils, which was pleasing on account of the luster it gave them. In course of practice he came to mix his colors with oil, instead of water, which rendered them brilliant without the trouble of varnishing. From this and subsequent experiments arose the art of painting in oil. The attention of the Italian painters was soon excited. John of Bruges was the founder of painting as a profession in Flanders. The chief masters of the school were Memling, Weyden, Rubens, Vandyck, Snyders, and the younger Teniers.

FLENSBORG, one of the most populous towns of Slesvig, at the extremity of the Flensborg Fjord, an inlet from the Baltic, forty miles N. W. of Kiel. It was taken from the Danes by the Germans in 1866. Pop. about 60,000.

FLETCHER, DUNCAN UPSHAW, a United States Senator from Florida, born in Sumter county, Ga., in 1859. He graduated from Vanderbilt University in 1880 and afterward studied law at that institution. He was admitted to the bar in 1881 and engaged in practice in Jacksonville, Fla. He was a member of the Florida House of Representatives in 1893, and for two years following was mayor of Jacksonville. He was appointed United States senator by the governor of the State in 1909, and was elected senator by the legislature in the same year. He was re-elected in 1914. He was chairman of the Senate Committee on Commerce.

FLETCHER, FRANK FRIDAY, an American admiral, born at Oskaloosa, Ia., in 1855. He graduated from the United States Naval Academy in 1875 and in the following year was promoted ensign. He was promoted through the various grades to the rank of rear-admiral, in 1911. After performing important duties on shore and at sea, he was in 1913 appointed commander of the 3d division of the Atlantic Fleet, and was later commander of the 2d and 1st divisions. In 1913 and 1914 he commanded the naval force on the west coast of Mexico, and on April 21 seized and occupied the city of Vera Cruz. In 1914 he was appointed commander-in-chief of the Atlantic Fleet, and in the following year was appointed admiral. During the World War he was a member of the War Industries Board of the Council of National Defense, and a member of the General Board of the Navy. He invented several pieces of mechanism for guns and was awarded a medal of honor for distinguished conduct in battle.

FLETCHER, GILES, an English clergyman and poet, cousin of John; born in London, England, about 1580. His only notable composition was a sacred poem entitled "Christ's Victorie and Triumph in Heaven and Earth over and after Death" (1610), rich in imagery and descriptions of natural scenery. Parts of it were utilized by Milton in his "Paradise Regained." He died in Alderton, in 1623.

FLETCHER, JOHN. See BEAUMONT, FRANCIS, AND FLETCHER, JOHN.

FLETCHER, SIR LAZARUS, a British scientist. He was born at Salford, England, in 1854, and was educated at Manchester Grammar School and Oxford University. In 1880 he became Keeper of Minerals in the British Museum and in 1882 Examiner for Natural Sciences Tripos, Cambridge. He is a member and official of many British and other scientific societies, and was vice-president of the Royal Society (1910-1912.). His publications include: "Introduction to the Study of Meteorites," "Introduction to the Study of Minerals," "Introduction to the Study of Rocks," "The Optical Indicatrix," and papers on the crystallographical, physical, and mineralogical subjects and on meteorites.

FLEUR DE LIS, in botany, various species of the genus iris; also *Phalangium liliago,* a liliaceous plant. In heraldry, the royal insignia of France. Its origin is disputed; by some it is supposed to represent a lily, by others the iron head of some weapon. In the old time the French Royal banner was *sémé* of *lys,* that is, completely covered with fleurs de lis; but from the time of Charles VI. it has consisted of three golden fleurs de lis on a blue field. It is of frequent occurrence in English armory. From the claims invariably put forth by English sovereigns to certain principalities in France, gained by inheritance or marriage, the French royal coat appeared as a quartering in the English royal arms; and though all such

claims had long ceased to be enforced or justified, it remained till the accession of George IV., by whom it was abolished.

FLEURUS, a town of Belgium, in the province of Hainault, near the Sambre, 7 miles N. E. of Charleroi. This place is noted for four important battles having taken place in its vicinity. The first took place on Aug. 30, 1622, between the Spaniards under Gonsalvo of Cordova, the general of the Catholic League, and the troops of the Protestant Union commanded by the Bastard of Mansfeld and the Dukes of Brunswick and Saxe-Weimar. Both sides claimed the advantage. The second was fought July 1, 1690, Montmorency, Duke of Luxembourg, defeating the Prince of Waldeck, one of the most able of the generals of the Augsburg League. The third was that in which General Jourdain defeated the Imperialists under the Prince of Coburg, June 26, 1794. The fourth, more commonly known as the battle of Ligny, took place on June 16, 1815. On that day Blücher was defeated by Napoleon.

FLEURY, a small village in France, about six miles N. W. of Verdun, at which were located some of the outer works defending Verdun during the World War. It was the center of some of the heaviest fighting during the attack on Verdun by the Germans, in June, 1916, known as the battle of Mort Homme.

FLEURY, CLAUDE (fle-rē′), a French Church historian; born in Paris, France, Dec. 6, 1640. His learning and unaffected simplicity made him a notable figure at the court of Louis XIV., and later at that of Louis XV., whose confessor he became. An "Ecclesiastical History" (1691-1720) forms his claim to enduring renown; the work coming down to 1414. He also wrote: "A History of French Law" (1674) and a "Historical Catechism" (1679). He died in 1723.

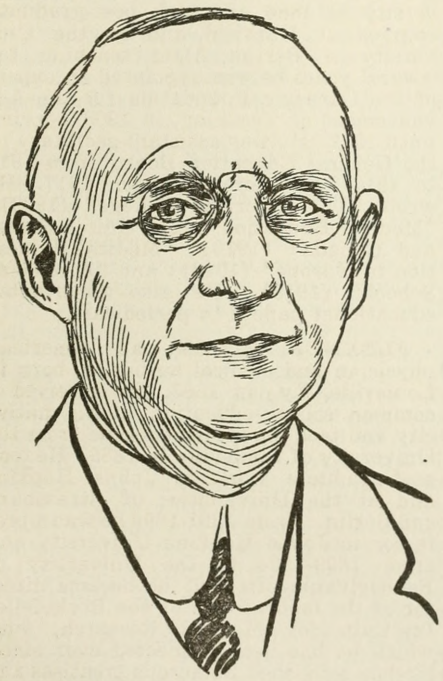
FLEXIBILITY, in physics, the property which all bodies possess to a greater or less degree, and which is evinced in their disposition to yield or change their form in a direction at right angles to their length, through their own weight or by means of any pressure or strain applied to them. Pieces of the same material differ from each other in the degree of flexibility they exhibit, in proportion to their length and thickness. Thus it is evident that a cylindrical bar of iron an inch in diameter and 20 feet in length will exhibit a far greater degree of flexibility than another which is only half the length, and has a diameter of two inches. Materials also exhibit a greater degree of flexibility in one condition than in another; metals, for instance, yielding far more readily to pressure when heated than when cold. The degree of flexibility possessed by any material is denoted by the extent to which it will bend, or by the weight which it will support without breaking. This property must not be confounded with that of elasticity; elastic bodies will return to their former shape when they have been bent or altered by pressure in any way; but bodies which possess flexibility without elasticity do not return to their original form in all cases. The consideration of the deflection or flexibility of beams of wood and iron bars and girders, as well as of ropes and chains, and other materials, is an important point in the construction of buildings, bridges, and engineering works of various kinds.

FLEXNER, ABRAHAM, an American educator, born in Louisville, Ky., in 1866, brother of Simon Flexner. He graduated from Johns Hopkins University in 1886 and took post-graduate courses at Harvard and at the University of Berlin. After teaching for several years he was appointed an expert of the Carnegie Foundation for the Advancement of Teaching, in 1908, serving until 1912. He was assistant secretary of the General Education Board from 1912 to 1917, and secretary from 1917. He wrote "The American College" (1909); "Medical Education in the United States and Canada" (1910); "Medical Education in Europe" (1912); and "A Modern School" (1916). He also contributed educational papers to periodicals.

FLEXNER, SIMON, an American physician and medical authority, born in Louisville, Ky., in 1863. He received a common school education in his native city and took his medical degree from the University of Louisville in 1889. He took post-graduate work at Johns Hopkins and at the Universities of Strassburg and Berlin. From 1891-1899 he was a professor in Johns Hopkins University and from 1899-1904 in the University of Pennsylvania. In 1903 he became director of the laboratories of the Rockefeller Institute for Medical Research, with which he has been connected ever since. He has published numerous treatises and monographs upon pathological and bacteriological subjects, and his work has been recognized abroad, where he has been made a member of many of the learned fraternities.

FLINT, a crypto-crystalline variety of quartz. It is usually gray, smoke-brown, or brownish black. If derived, as it mostly is, from the cretaceous forma-

tion, the white of the chalk is still seen on its external surface. Luster subvitreous; fracture conchoidal, leaving a cutting edge. Most of the flints scattered on the surface of the ground or existing in Tertiary or more recent sedimentary deposits came originally from the cretaceous rocks, one division of which is termed Upper White Chalk with flints, this being distinguished from the Lower White Chalk without flints. Next to the Maestricht beds and Faxœ limestone, the chalk with flints constitutes the highest or newest layer yet discovered of the sedimentary rocks. The organic portion of flint pebbles consists of diatoms, seaweeds of low organization, the minute infusorial animals called polycistina, the spicules of sponges, with echinoderms, etc. They are the same as those in agate and chalk. Liquor of flints, a solution of flint in potassic hydrate. To skin a flint, to descend to any false economy or meanness to make a trifling sum of money.



DR. SIMON FLEXNER

FLINT, a city and county-seat of Genesee co., Mich.; on the Flint river and on the Grand Trunk Western and the Père Marquette railroads; 64 miles N. N. W. of Detroit. Here are a court house, the State Institution for the Deaf and Dumb, a private retreat for the insane, a high school, waterworks, gas and electric lights, public library, a National bank and several daily, weekly, and monthly periodicals. It has a large number of saw mills, carriage and wagon factories, automobile works, iron works, stove works, flour and woolen mills, etc. Pop. (1910) 38,550; (1920) 91,599.

FLINT, AUSTIN, an American physician; born in Petersham, Mass., Oct. 30, 1812; was graduated at the medical department of Harvard College in 1833. His professional career began in Northampton, Mass., but after a few years' practice there he removed to Boston, thence to Buffalo, where he remained till 1844. He then accepted a call to a chair in the Rush Medical College in Chicago, but soon returned to Buffalo, where he established the Buffalo "Medical Journal" in 1846, and where later he was one of the founders, and for six years a professor, of the Buffalo Medical College. He was a professor in Louisville University in 1852-1856; Professor of Pathology in the Long Island College Hospital in 1861-1868; president of the New York Academy of Medicine in 1872-1875, and of the American Medical Association in 1884; delegate to the International Medical Congress in Philadelphia in 1876; etc. He was the author of numerous text-books, clinical reports and medical papers. He died in New York City, March 13, 1886.

FLINT GLASS, a species of glass made of white sand, 52; carbonate of potash, 14; oxide of lead, 33; alumina, 1; with metallic additions to neutralize color. Pure white sand free from oxide of iron is required for flint glass, as iron imparts a green color. The articles are made by the agency of the blow-pipe, or ponty, the mold and press, and frequently by a combination of blowing and pressing. The silica for its manufacture was formerly derived from pulverized flints, and hence its name. The presence of lead gives it a peculiar property of refracting light, which causes it to be used for lenses. Flint glass fuses at a lower temperature than ordinary glass, such as crown, plate, or window glass. Flint glass is softer than some other varieties, and is the kind which is cut. It is much used for tumblers, fine tableware, and various articles of decorative furniture and fittings.

FLINT IMPLEMENTS, a generic term used for any implements of flint obtained from Pleistocene or more recent deposits, each being afterward named more specifically as its exact nature becomes understood. Evans divides the implements into three classes — spear heads, oval or almond-shaped flint imple-

ments, and flint flakes. Such relics of early man had been found with the bones of an elephant, in 1715, in the gravel of London, England. Similar remains were exhumed at Hoxne, near Diss, in 1797, by John Frere. About 1833 or 1834, the Rev. Mr. McEnery, a Roman Catholic priest, discovered similar ones in Kent's Hole, Torquay, in Devon, England. From about 1841, M. Boucher de Perthes, of Abbeville, collected flint implements from the valley of the Somme, in France, publishing the result in his "Celtic Antiquities," in 1847.

Many flint implements have been found in the S. and E. of England, in Bedfordshire, in Suffolk, Hampshire, Wiltshire, and in the N. and N. E. of London, in Essex, in Buckinghamshire, etc. The oldest ones are palæolithic, and are unpolished; the newer neolithic, and are polished. The implements from the Somme are of the former kind, and are the oldest known. According to Prof. Boyd Dawkins, the river-drift man inhabiting the valleys of the Somme, the Thames, etc., was older than the cave man of Brixham, Kent's Hole, and other caverns. The former lived in the middle part of the Pleistocene (Lyell's Upper Pliocene) period and inhabited Palestine, India, and this country as well as Europe.

FLINTSHIRE, a maritime county of North Wales, with an area of 257 square miles and a coast line of about 20 miles. Only about one-seventh of the area is cultivated. The most important industry is mining, which includes coal, iron, lead, copper, and zinc. The chief rivers are the Dee, Alyn, and Clwyd. Pop. about 70,000. The chief town is Flint. Other important towns are St. Asaph, Holywell, and Hawarden.

FLOATING DOCK. See DOCK.

FLODDEN, a village of England, Northumberland county, near the Scottish border, 5 miles S. E. of Coldstream; memorable as being the scene of the battle of Flodden Field, one of the most sanguinary conflicts recorded in British history. James IV., King of Scotland, having invaded England with a large force, was encountered here, Sept. 9. 1513, by an English army under the Earl of Surrey. James, who was destitute of every martial quality except bravery, was killed, and his army totally defeated. The loss on the part of the Scots was extremely great. Besides the king himself, no fewer than 12 earls, 13 barons, and 5 eldest sons of peers, with a vast number of knights and persons of distinction, and probably about 10,000 common soldiers, were left dead on the field. The English loss was about 7,000. This is by far the most calamitous defeat recorded in Scottish annals; and there was scarcely a family of distinction in the kingdom who did not lose one or more members in it. Archibald Douglas, the great Earl of Angus, for instance, was killed, together with his six sons and 200 knights and gentlemen of the name of Douglas.

FLOETZ ROCKS, in geology, a name applied by Werner and his followers to the Secondary rocks of Germany, because they were supposed to occur most frequently in flat, horizontal beds.

FLOODS are caused by excessive rains, giving rise to an overflow of the rivers; by the bursting of the banks of rivers, lakes, and reservoirs; by the sudden melting of ice and snow; and by irruptions of the sea, produced by high tides, wind storms driving the sea water inland, earthquakes, volcanic outbreaks, and the bursting of sea banks. The felling of forest trees throughout extensive tracts of mountainous country also tends to make the rivers which have their origin there swell rapidly after a heavy rainfall (see FORESTRY); good and complete drainage of land has the same tendency.

FLOOR, in building, the surface on which a person walks in a room or house. It may be of masonry, brick, tiles, concrete, earth, boards. The term usually refers to boards laid close together, and nailed to timbers which are termed joists. A single floor is one in which the joists pass from side to side of the house, resting upon wall-plates and sustaining the floor above, and the ceiling of the room below. A double floor is one in which the primary timbers are binders which rest upon the wall-plates, and support the floor or bridging joists and the ceiling joists. A framed floor has an additional member, which assumes the primary position. The girder rests on the wall-plates and supports the binding joists, whose ends rest thereupon. The binding joists support the bridging or floor joists and the ceiling joists, as before described.

In geology and archæology, the part of a cavern corresponding in situation to the floor of a house. As a nautical term the bottom part of the hold on each side of the keelson; the flat portion of a vessel's hold. In hydraulic engineering, the inner piece of the two which together form the bucket of an overshot water wheel. In mining, the bottom of a coal seam; the underlay on which the coal, lead, or iron ore rests. To take the floor: To rise to address a public meeting; also to stand up to dance (Irish).

FLOQUET, CHARLES THOMAS (flō-kā'), a French statesman; born in St. Jean de Luz in 1828; began life as a lawyer in Paris. His cry, *"Vive la Pologne, Monsieur!"* ("Hurrah for Poland, Sir!") addressed to the Czar Alexander II., in the Palace of Justice in 1867, made him a political celebrity. On the fall of the empire he was appointed one of the deputy mayors of Paris, but was forced to resign on account of his complaisance toward the Red Republicans. Later he was elected to the Paris municipal council, and in 1876 became one of the Deputies for Paris. He sat in the Chamber till 1882, when he was appointed Prefect of the Seine; re-entered the Chamber in 1882 and was elected its president in 1885, but resigned in April, 1888, to become prime minister. In 1889 he was again elected president of the Chamber. He was the Radical candidate for the Presidency of the Republic in 1887; but his career was cut short by the Panama Canal scandal. He died in Paris, Jan. 18, 1896.

FLORENCE, a city and county-seat of Lauderdale co., Ala.; on the Tennessee river, and on the Southern and the Louisville and Nashville railroads. Here are the State Normal College, a high school, several churches, and a number of weekly newspapers. The city has manufactories of iron, cotton, wagons, ice, flour, stoves, etc. Pop. (1910) 6,689; (1920) 10,529.

FLORENCE, a city of South Carolina, The county-seat of Florence co. It is on the Atlantic Coast Line and the Southern Carolina Western railroads. It is the center of an important agricultural region and has an important trade in tobacco and cotton. Its industries include cottonseed oil mills, railway repair shops, machine shops, lumber mills, etc. It is the seat of the South Carolina Industrial School and a State agricultural experiment station. Within its borders is a national cemetery. Pop. (1910) 7,057; (1920) 10,968.

FLORENCE, a famous city of central Italy; on both sides of the Arno, 63 miles S. by W. of Bologna; 68 E. N. E. of Leghorn, and 187 N.N.W. of Rome. It stands in a richly wooded, well-cultivated, and beautiful valley, encircled by the Apennines, and is well built and agreeable. Its shape is nearly a square, the sides of which almost correspond with the cardinal points; the Arno intersects it from S. E. to N. W., three of the quarters into which it is divided being situated on the right, and the fourth on the left bank of the river. The communication between the opposite sides of the river is maintained by means of seven bridges. Florence contains a great number of magnificent edifices and squares, generally adorned with statues, columns, or fountains; there are no fewer than 170 churches, 89 convents, 2 royal, and many other palaces, hospitals, and theaters great and small. Each angle of a street presents an architectural view, fit to be drawn for a scene in a theater. Many of the houses are palaces, and are fitted up with great magnificence.

The Piazza Reale is the largest square; it has a fine marble fountain, and an equestrian statue in bronze of Duke Cosmo I. by John of Bologna. The Piazza del Mercato Vecchio, exactly in the center of the city, has a marble column from which Florence radiates for one mile on each side. The Arno is decidedly superior to the Tiber at Rome. The bridge Santa Trinita, built of marble in 1559 by Ammanati, is designed in a style of elegance and simplicity unrivaled by the most successful efforts of modern artists. The bridges, and the handsome though not spacious quays by which the river is bordered, afford fine views of the river, Florence being in this respect much superior to the "Eternal City." The duomo, or cathedral, a vast edifice, coated with marble, about 500 feet in length, and 384 feet in height to the top of the cross, stands in a spacious square. It was begun by Arnolfo di Lapo in 1296, and finished by Brunelleschi in 1426. It is built of brick, and veneered, as it were, with parti-colored marble slabs arranged in narrow strips or panels. The interior is very striking. The campanile or belfry, adjoining the duomo, but detached from it, is a fine tower 288 feet in height. The church of Santa Croce, called the Pantheon of Florence, is interesting from its containing the remains and tombs of four of the greatest men of modern Italy, or indeed of modern times—Michael Angelo, Galileo, Machiavelli, and Alfieri. Among the palaces are the Palazzo Vecchio, or Old Palace, inhabited by the Medici when citizens of Florence, which was begun in 1298, and finished in 1550. It is in a massive, severe, and gloomy style, with a tower 268 feet high. Adjoining it is the Piazza del Palazzo Vecchio, a square containing a fine collection of statues, and a noble arcade, the Loggia di Lanzi, under the porticoes of which are magnificent groups of sculpture. The Palazzo Pitti, erected in 1440, the ordinary residence of the King of Italy, is a vast and heavy structure; it is furnished in the most costly manner, and is enriched with a great number of the choicest works of art and virtu, and an excellent library. Attached to this

palace are the Boboli Gardens, laid out by Cosmo I. in 1550, in the classical style. Connected with these gardens is the botanical garden, a museum of natural history, the Fontana anatomical collection in wax, etc. Another fine palace, the Riccardi (built in 1440), has a noble gallery with a ceiling painted by Luca Giordano, and a library of 40,000 volumes, open to the public. But the crowning glory of Florence is its Grand Gallery, occupying the upper floor of the Uffizi, a building erected after a design of Vasari, by Cosmo I., consisting of two parallel corridors or galleries, each 448 feet in length, and 72 feet apart, united at one end by a third corridor. This contains some masterpieces of statuary, as the world-renowned "Venus de Medici," "The Knife-Grinder," the "Fawn," "Niobe and her Children," etc. The collection of pictures comprises superb examples of all the best schools. A splendid apartment, known as the Tribuna, contains the rarest treasures of the collection, and is in itself a wonder of art, with its cupola inlaid with mother-of-pearl, and its rich marble pavement. Besides the Riccardi and Laurentian libraries, the Magliabecchi library, containing a rare, extensive, and valuable collection of books, is also open to the public. Florence is subject to fogs in the winter; but in spring and autumn it is a delightful residence. The literary and educational institutions are both numerous and important. At the head of these is the famous Academia della Crusca. The charitable institutions are numerous, extensive, and well conducted.

The encouragement given under the late as well as the present government, to artistic and scientific studies, has conferred advantages on Florence unknown in most other parts of Italy. Manufactures silks, straw hats, articles of virtu, as intaglios, etc., jewelry, porcelain, perfumery, etc. Florence has produced more celebrated men than any other place in Italy, or, perhaps, of Europe; among others may be specified Dante, Petrarch, Boccaccio, Villani, Cosmo and Lorenzo de Medici; Galileo, Michael Angelo, Leonardo da Vinci, Benvenuto Cellini, Alberti, Lapo, Brunelleschi, Giotto, Andrea del Sarto, Machiavelli; Popes Leo X. and XI., Clement VII., VIII., and XII. The origin of this city is not clearly ascertained; but it owed its first distinction to Sylla, who planted in it a Roman colony. In 541 it was almost wholly destroyed by Totila, King of the Goths. About 250 years afterward it was restored by Charlemagne. It then became the chief city of a famous republic; and was for a lengthened period in Italy what Athens had been in Greece in the days of Xenophon and Thucydides. At length, in 1537, the Medici, from being the first of her citizens, became sovereign dukes of Florence. The city afterward became the capital of the former grand-duchy of Tuscany till 1860, when it was annexed to the new kingdom of Italy, and in 1865, the seat of government was transferred thither from Turin. Pop. about 235,000.

FLORENCE CRITTENTON MISSION, an organization, established in 1883 by C. F. Crittenton, having for its purpose the tendering of aid to women in need of it, particularly those of an unfortunate class. The mission has established homes in seven cities of the United States, and has one in Marseilles, France, and another in Tokyo, Japan. Its principal establishment is in New York City, and here over 1,000 girls have been cared for. The head office is in Washington, D. C., and a feature of the mission is the provision of summer homes, to which girls can be sent for the summer holidays.

FLORENTINE SCHOOL, a school of painting remarkable for greatness; for attitudes seemingly in motion; for a certain dark severity; for an expression of strength by which grace is perhaps excluded; and for a character of design approaching to the gigantic. This school has an indisputable title to the veneration of all the lovers of the arts, as the first in Italy which cultivated them.

FLORES, a department of Uruguay, with an area of 1,744 square miles. The surface is level and well watered. The chief industry is the raising of cattle. Wheat and corn are also produced. The capital is Trinidad. Pop. about 25,000.

FLORIDA, a State in the South Atlantic division of the North American Union, bounded by Alabama, Georgia, the Atlantic Ocean, Gulf of Mexico, and the Straits of Florida; area, 58,680 square miles; admitted as a State in 1845; number of counties, 54. Pop. (1890) 391,422; (1900) 528,542; (1910) 751,139; (1920) 968,470; capital, Tallahassee.

Topography.—The surface of the State is very low and flat, gradually rising from a few feet above sea-level along the coast to a central ridge with an altitude of about 300 feet. The flat lands extending along the coasts consist of open grass-grown savannahs, cypress swamps, pine forests, and "cabbage hammocks," so called from the extensive growth of the cabbage palms. The W. part of the State, excepting on the coast, is quite hilly. The S. part of the peninsula is built up of successive coral


FLORIDA
SCALE OF STATUTE MILES
0 10 20 30 40 50 60 80 100
SCALE OF KILOMETRES
0 10 20 30 40 60 80 100 120 140
County Towns
Railroads
Northwestern Portion of FLORIDA
Same Scale as Main Map
GULF OF MEXICO
ATLANTIC OCEAN
APALACHEE BAY
FLORIDA BAY
BIG CYPRESS SWAMP
Longitude 87° West from 86° Greenwich
Longitude 85° West from 84° West C from 83° Greenwich D Key West
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dikes; the upper part being occupied by Lake Okechobee, whose shallow waters gradually merge into the Everglades, an extensive swamp covering the entire lower part of the State. The Everglades are penetrated in all directions by a network of small, shallow streams, and at short intervals over the entire area are found wooded islands covered with semi-tropical vegetation. These islands are supposed to have been formerly surrounded by the ocean and to have borne the same relation to the mainland as do the reefs and keys of to-day. The Everglades are separated from the Gulf by extensive cypress swamps, the forests extending down the W. coast, narrowing out around the cape, and extending up along the Atlantic coast. Many of the Florida swamps are so densely overgrown with vegetation that they have been explored but little and are considered impassable. Among these are the Great Cypress in the S. part, and the Fen Holloway and Wakulla swamps farther N. The Okefenoke swamp in the extreme N. extends over into the State of Georgia. Almost the entire Atlantic coast is protected from the ocean by sand bars and coral reefs. Florida is noted for the number, size, and clearness of her springs, the most famous being the Silver Spring near Ocala in Marion county, with an estimated output of 300,000,000 gallons daily. Other notable springs are the Wakulla, near Tallahassee, the Wekiva in Orange county, and the Blue in Marion county. There are numerous sulphuretted springs along the coast; one near St. Augustine, 2 miles out at sea, boils so violently that the waves break against it as though it were a sunken reef. There are numberless lakes, many being aggregations of smaller springs. The largest are Okechobee, Munroe, George, Kissimmee, Crescent, Dexter, Apopka, Harris, and Eustis. These lakes are usually quite shallow and are in many cases connected with the sea by subterranean passages, often causing strange fluctuations, rising and falling at irregular periods.

Geology.—The substratum of the greater part of the State is of Upper Eocene or Vicksburg limestone, while the coasts and the S. parts are mostly Postpliocene, or coralline limestone. Considerable phosphate exists in various forms, land and river pebble, hard and soft rock, and vertebrate remains, the hard rock extending in a belt running S. E. from Tallahassee to the S. E. part of Pasco county.

Mineral Production.—The only important mineral product is phosphate rock. About 1,500,000 tons, valued at about $4,000,000, are produced annually. Other mineral products are fuller's earth, lime, and mineral waters.

Soil.—The soil is mostly sandy, but supports vegetation in great luxuriance. The surface soil, depending on the character of the underlying rock, is rich in phosphates, and these, together with decomposed vegetable matter, produce a very rich soil. In the N. and middle portions of the State, the oak, hickory, and pine grow extensively, while the long-leaved pine, pitch-pine, and cypress cover the S. portions.

Agriculture.—Florida exhibits the vegetable productions of both temperate and semi-tropical nature. In the N. the products include peaches, pears, and cotton, while the middle and S. counties produce the finest oranges, pineapples, mangoes, cocoa palms, guavas and almost all tropical fruits. The acreage, value and production of the principal crops in 1919 were as follows: corn, 840,000 acres, production 12,600,000 bushels, value $17,640,000; hay, 113,000 acres, production 141,000 tons, value $3,243,000; peanuts, 216,000 acres, production 3,402,000 bushels, value $7,178,000; tobacco, 4,200 acres, production 3,990,000 pounds, value $2,175,000; potatoes, 24,000 acres, production 1,824,000 bushels, value $3,830,000; sweet potatoes, 41,000 acres, production 4,100,000 bushels, value $5,740,000; cotton, 117,000 acres, production 17,000 bales, value $3,570,000.

Manufactures.—There were, in 1914, 2,518 manufacturing establishments, employing 55,608 wage earners. The capital invested was $88,319,000 and the wages paid $24,822,000. The value of the materials used was $33,816,000 and the value of the finished product was $81,112,000. The principal manufactures are naval stores, cotton-seed oil, cigars, lead pencils, refined sugar, flour, salt by evaporation, palmetto hats, braids, and wooden boxes. Lumbering is a leading industry; fishing, sponge and coral gathering afford occupations for many. Jacksonville has many canning establishments, and Key West and Tampa are noted for their fine cigars.

Banking.—On Oct. 31, 1919, there were 54 National banks in operation, having $6,460,000 in capital, $5,502,000 in outstanding circulation, and $25,084,000 in United States bonds. There were also 184 State banks with $5,585,000 capital and $2,147,000 surplus. In the year ending Sept. 30, 1919, the exchanges at the United States clearing-house at Jacksonville aggregated $411,247,000, an increase over the previous year of $202,120,000.

Education.—School attendance is not compulsory. Separate schools are provided for white and colored children.

There are about 200,000 enrolled pupils in the elementary schools and about 6,000 teachers. There are 100 public high schools with about 7,000 pupils. The total annual expenditure for educational purposes is about $4,000,000. The institutions for higher education include the University of Florida at Gainesville, the State College for Women at Tallahassee, Rollins College at Winter Park, John B. Stetson University at De Land.

Churches.—The strongest denominations in the State are the African Methodist Episcopal; the Methodist Episcopal, South; Regular Baptist, South; Regular Baptist, Colored; Roman Catholic; Methodist Episcopal; Protestant Episcopal; Presbyterian; Disciples; and Congregational.

Finance.—The receipts during the fiscal year 1919 amounted to $6,334,025, and the disbursements to $6,369,753. There was a balance on hand January 1, 1919, of $1,861,628, and on January 1, 1920, there was a balance of $1,825,899. The public debt amounted to $601,567.

Transportation.—There are about 6,000 miles of steam railway and about 200 miles of electric railway. The Atlantic Coast Railway and the Louisville and Nashville Railway run through the State. The Florida East Coast Railway with an extension to Key West was opened in 1912. A large trade is carried on through Pensacola and other ports. Harbor improvements have been carried out at Jacksonville.

Charities and Corrections.—The charitable and correctional institutions include the State Institute for the Deaf, Dumb, and Blind at St. Augustine, Hospital for the Insane at Chattahoochee; Industrial School for Boys, at Marianna; Prison Farm, at Raiford; Industrial School for Girls, at Ocala.

State Government.—The governor is elected for a term of four years. Legislative sessions are held biennially, beginning on the first Tuesday in April, and are limited to 60 days each. The legislature has 32 members in the Senate and 75 in the House. There are 4 representatives in Congress.

History.—Florida was discovered by Juan Ponce de Leon, March 27, 1513, on Easter Sunday, after which the peninsula was named. He and his successors explored a large part of Florida in search of gold and "the fountain of perpetual youth." He was killed in a fight with the natives in 1521. A Spanish force of 400 men under Panfilo de Narvaez landed in 1528, and all but four perished. In 1539 a force of 600 under Fernando De Soto landed at Tampa Bay and moving to the N. and W., overcoming the natives by treachery and violence, passed beyond the present limits of Florida. A settlement of French Huguenots was attempted in 1564, but two years later was exterminated by the Spanish. From this time the Spanish were in absolute control, and settlements were made at Pensacola and elsewhere along the coast. In 1687 the first large consignment of negro slaves was brought to Florida. From 1702 to 1748 there were continued hostilities between the Spanish, French, and British along the coast, during which St. Augustine was twice besieged by the British. A truce lasted from 1748 to 1752, when war was again renewed, resulting in the exchange of Cuba for Florida, the British immediately taking possession. Shortly after the American Revolutionary War Florida was re-ceded to Spain. West Florida was sold to France in 1795. During the War of 1812 the British occupied Pensacola with the consent of Spain. In 1814 it was captured by the United States forces under Andrew Jackson. Then followed a long series of wars with the natives, the whole of Florida being ceded to the United States by Spain in 1819. In 1822 Florida was organized as a Territory of the United States. From 1835 to 1842 the Seminole Indians were in active hostility and on their final surrender they were removed to a special reservation. Florida was admitted to the Union as a State in 1845. At the outbreak of the Civil War the principal government posts were seized by the State forces. Fort Pickens, however, was held by a Union garrison, and after being re-enforced was used as the base of operations in the vicinity. Jacksonville was several times occupied by the contending forces, and many minor engagements took place along the coast. Florida was given full civil government July 4, 1868.

FLORIDA KEYS, or **REEFS**, in Florida, a chain of small islands, keys or reefs, and sandbanks, extending S. W. from Cape Florida, about 220 miles. They are very considerable in number, but only a few are of any importance. Among these may be mentioned Cayo Largo, Indian Key, Long island, Old and New Matacombs, Cayo de Boca, and Key West, on which the city of Key West is built.

FLORIDA, UNIVERSITY OF, a State institution for higher education, established in 1905. It is organized into a Graduate School; College of Arts and Sciences; College of Agriculture; College of Engineering; College of Law; Teachers' College; University Extension Division; and an Agricultural Experiment Station. It has an income of over $100,-

000 a year for current expenses. In 1919 there were 43 instructors and 988 students. President, A. A. Murphree, LL.D.

FLORIO, JOHN, an English lexicographer, and the translator of Montaigne; born in London, England, about 1553. His father was a Protestant exile and Italian preacher in London. Florio appears as a private tutor in foreign languages at Oxford about 1576, and two years later published his "First Fruits, which yield Familiar Speech, Merry Proverbs, Witty Sentences and Golden Sayings," accompanied by "A Perfect Induction to the Italian and English Tongues." In 1581 Florio was admitted a member of Magdalen College, and became a teacher of French and Italian. He enjoyed the patronage successively of Leicester, the Earl of Southampton, and other noble persons. His next work was "Second Fruits, to be gathered of Twelve Trees, of divers but delightsome Tastes to the Tongues of Italian and English men," with, annexed to it, the "Garden of Recreation," yielding 6,000 Italian proverbs (1591). His Italian and English dictionary, entitled "A World of Words," was published in 1598. Florio was appointed reader in Italian to Queen Anne, and afterward groom of the privy chamber. In 1603 he published in folio his famous translation of Montaigne. It was long believed that the pedantic Holofernes in "Love's Labor's Lost" was a study after Florio. He died in Fulham, in 1625.

FLOTOW (flō'tō), **FRIEDRICH ADOLPHUS VON**, a German composer; born in Teutendorf, Mecklenburg-Schwerin, Germany, April 26, 1812. He studied music in Paris, but his earlier operas did not find favor with the Parisian opera house directors, so he had to content himself with performances in the aristocratic private theaters. At length "Medusa's Shipwreck" was successfully produced at the Renaissance Theater in 1839. This was followed by "Camoen's Slave" (1843) and "The Soul in Pain" (1846), performed in London as "Leoline." "Alexander Stradella" was first performed at Hamburg in 1844, and his most successful work, "Martha," at Vienna in 1847. Among his other works are: "Indra" (1853); "The Phantom" (1869); and "The Enchantress" (1878). He was director of the court theater at Schwerin in 1855-1863; the last years of his life were chiefly spent at Vienna. He died in Darmstadt, Germany, Jan. 23, 1883.

FLOTSAM, JETSAM, and **LIGAN**, in law: Flotsam, or floatsam, is derelict or shipwrecked goods floating on the sea; jetsam, goods thrown overboard which sink and remain under water; and ligan, goods sunk with a wreck or attached to a buoy, as a mark of ownership. When found such goods may be returned to the owner if he appear; if not, they are the property of the crown.

FLOUR MILL, a mill for grinding and sifting flour.

FLOWER, in botany, a developed terminal bud inclosing the organs of reproduction by seed. The earlier botanists limited it to the corolla of a plant, but Linnæus extended it to include the calyx, corolla, stamens, and pistil. The two last are the only essential parts. This is the modern sense of the term. The manner in which its parts are arranged is called their estivation, and the calyx, corolla, and other parts are generally believed to be transformed leaves arranged on a branchlet; but many writers consider the petals to be transformed stamens. The arrangement of flowers on a branch or stem is called INFLORESCENCE (*q. v.*). The term Flower of Constantinople, or Flower Constantinople, is a translation of the old name *Flos constantinopolitanus*, given to the plant now called *Lychnis chalcedonica*. It is named also flower of Bristowe. The flower of the Axe is *Lobelia urens*, found in England only near Axminster in Devon; the flower of Crete is *Mesembryanthemum tripolium;* and flower of Jove *Lychnis flos jovis;* flower of four hours, *Mirabilis dichotoma;* flowers of heaven, a fungal, *Nostoc cæruleum;* and flowers of tan, *Æthalium*, a gasteromycetous fungal. It is so called from its growing on tan. In chemistry, flowers used to be the name given to bodies of a powdery or mealy consistence or form, *e. g.*, flowers of sulphur, a name sometimes given to sublimed sulphur. In printing, ornamental types or blocks for borders of pages, cards, and the like.

FLOWER, ROSWELL PETTIBONE, an American financier; born in Jefferson co., N. Y., Aug. 7, 1835; began his business and political career in Watertown, N. Y., where he organized the Jefferson County Democratic Club. Hi success in politics attracted the atter tion of Samuel J. Tilden, through whose influence he was appointed chairman of the Democratic State Committee in 1847. Four years later he was elected to Congress, and in 1886 was appointed president of the Subway Commission. He was re-elected to Congress in 1888 and 1890, and in 1891 was elected governor of New York. From the close of his term till his death he applied himself to the interests of his large banking house

and to a systematic course of philanthropy. He died in Eastport, Long Island, N. Y., May 12, 1899.

FLOYD, JOHN BUCHANAN, an American statesman; born in Blacksburg, Va., June 1, 1807; was admitted to the bar in 1828; served in the Virginia Legislature several terms; and was governor of the State in 1850-1853. In 1857 President Buchanan appointed him Secretary of War. While in the cabinet he was detected in the act of stripping the Northern arsenals of arms and ammunition, and indicted by the grand jury of the District of Columbia as being privy to the abstracting of $870,000 in bonds from the Department of the Interior. He fled, however, to Virginia, where, at the close of 1860, he was commissioned a general in the Confederate army. In that capacity he was driven from West Virginia by General Rosecrans. The night before the surrender of Fort Donelson he stole away in the darkness, throwing the responsibility of surrendering on a subordinate officer, and, being censured by the Confederate government, never afterward served in the army. He died near Abingdon, Va., Aug. 26, 1863.

FLUID, having the parts easily separable; consisting of particles which move and change their relative positions very readily; capable of flowing; liquid; gaseous. The fundamental property of fluids, viewed as forces, in physics, is their equality of pressure in all directions. The term includes both liquids and gases. Elastic fluids: In physics, gases. Electric or electrical fluid: In electricity, a fluid composed, in the opinion of Symmer, now generally accepted, of two fluids, the positive and the negative. Imponderable fluids: In physics, a name sometimes given to heat, light, magnetism, and electricity. They are mobile and yet, if consisting of matter, are in such a state of tenuity that they possess no perceptible weight. Magnetic fluids: In magnetism, two fluids assumed to exist. They are called respectively the N. or boreal fluid and the S. or austral fluid, the former predominating at the N. and the latter at the S. pole of the magnet. Sometimes the N. fluid is called the positive, and the S. fluid the negative one. Ponderable fluids: In physics, those possessed of weight; as water and carbonic acid gas.

FLUORESCEIN, $C_{20}H_{12}O_5$. An important dye-stuff, occurring as dark-red crusts, almost insoluble in water, but readily soluble in alkalies and in alcohol. Its alkaline solutions are dark reddish-brown in color, and when diluted show a remarkable yellowish-green fluorescence, to which the material owes its name. It is prepared by heating together phthalic anhydride and resorcinol. As a dye, fluorescein has only a limited application, as the yellow color which it produces on wool and silk is not permanent. It is used largely, however, in admixture with other dyes to produce fluorescence in the dyed material. The important dye Eosin is made from fluorescein.

FLUORESCENCE, in optics, a quality which exists in the rays of light by which, in certain circumstances, they undergo a change of refrangibility. Hence, certain solutions which, when viewed by transmitted light, are colorless, become bluish under reflected light. Fluorescence was discovered by Stokes in 1852.

FLUORINE. A very pale yellow gas, atomic weight 19, molecular weight 38, density (compared to air = 1) 1.31. It does not occur in the free state, but its compounds (fluorides) are found in abundance; the best known being fluorspar and chrysolite. It is considered to be the most active of the elements. It decomposes water with formation of hydrofluoric acid, oxygen and ozone; all metals are attacked by the gas, some taking fire in it, spontaneously, and many other elements combine with it with incandescence. It is prepared by the electrolysis of a solution of potassium fluoride in anhydrous hydrofluoric acid, hydrogen being evolved at the kathode and fluorine at the anode.

FLUOROSCOPE, a device invented by T. A. Edison for use in making observations of the influence of the X-rays.

FLUTE, in music, a popular instrument, the use of which, under various forms, may be traced to the most remote ages. Of its origin no direct account can be given. In its primitive state the flute was played like the modern flageolet, with a mouth-piece at the upper end; and from the shape of this mouth-piece, which resembled the beak of a bird, it received the name of flute à bec. In this form, with slight alterations, it continued until the beginning of the 18th century, when it was gradually superseded by the flauto traverso, or transverse flute, so called from its being blown at the side, and consequently held in a horizontal position. At its introduction this instrument was about 18 inches in length, and had but one key. Shortly after, a movable head-joint was invented, its length being increased, and more keys added, some flutes at the present time having more than a dozen keys, and a few less than

six. By means of these they are able to execute any music, however chromatic, if within their compass, which extends from C below the treble to C in altissimo. In December, 1832, a flute of an entirely new construction was invented by Mr. Bœhm, of Munich. It, however, remained in obscurity until 1837, when it was adopted and introduced to the French professors by Mr. Cadmus; but they considered its adoption would be attended with too much trouble, in consequence of its having an open G-sharp key. This, however, was soon afterward remedied by Mr. Dorus, who put a shut G-sharp key in its place. It now became universally adopted.

In architecture, an upright channel on the shaft of a column, usually ending hemispherically at the top and bottom. Their plane or horizontal section is sometimes semicircular, or segmental, or elliptical, as in some examples of Grecian architecture. The Doric column has 20 flutes round its circumference; the Ionic, Corinthian, and Composite have respectively 24.

FLUXION, in medicine, an unnatural flow or determination of blood or other humor toward any organ; a catarrh.

In mathematics, a method of calculation resulting from the operation of fluents, or flowing numbers.

FLY, in zoölogy, a name applied almost indiscriminately to all insects possessing wings; being often extended to all insects of the sub-order *Diptera*, and often also restricted to the family *Muscidæ*. The fly is characterized as possessing a pair of veined and membranous wings, with two movable bodies called balancers (halteres), placed a little behind them. The mouth is formed of between two and six setaceous pieces of scaly texture, and these pieces are either inclosed in a proboscis-like sheath, or covered by one or two laminæ, which form it. The head is globular or hemispherical. The mouth is only formed for transmitting fluids, and is consequently very delicate in structure. The sucker performs the part of a lancet, and pierces the envelope of vegetable or animal fluids, in order to allow of the fluid itself being transmitted up into the mouth of the insect. The antennæ are united in front, and are approximated at the base. Above the true wings of the insect and a little behind them, are the balancers or halteres; these are almost membranous, and are furnished with two little knobs at their extremities, which are capable of dilatation. The legs of this class of insects are long and slender; and the feet, it is well known, are furnished with skinny palms, to enable them to stick on glass and other smooth bodies by means of the pressure of the atmosphere.

In machinery, that part of a machine which, being put in motion, regulates the rest. In nautical language that part of a compass on which the 32 points are drawn, and to which the needle is attached underneath; the compass-card. In printing, that part of the machinery of a printing press which withdraws the sheet, and lays it aside after the impression is made.

FLY CATCHERS, the *Musicapidæa*, an extensive family of birds, order *Insessores*, represented in North America by about 30 species. As their name implies, the fly catchers prey on insects, which they seize in mid-air. They have the beak horizontally depressed, and armed with bristles at its base, with the point more or less decurved and emarginated. The value of the insectivorous family of birds to man is incalculable. One of the best types of fly catchers is that presented by the tyrant fly catcher, king bird or bee martin, *Muscicapa Tyrannus*, or *Tyrannus Carolinensis*. This bird is peculiar to America E. of the Rocky Mountains. It is 8 inches in length, and 14 in extent of wing. The general color of the upper parts is a dark bluish-gray, inclining to dull slate-black, on the head of which the central feathers along the crown form a gorgeous orange patch. The European species, *Muscicapa grisola*, the beam bird or bee bird, is distinguished from any other by having much more slender bills, with shorter bristles at the gape.



FLYING SQUIRREL

FLYING BUTTRESS, in architecture, a structure in the form of an arch, spanning the roof of an aisle between an outer buttress and the wall of the nave. It assists in resisting the thrust of the roof.

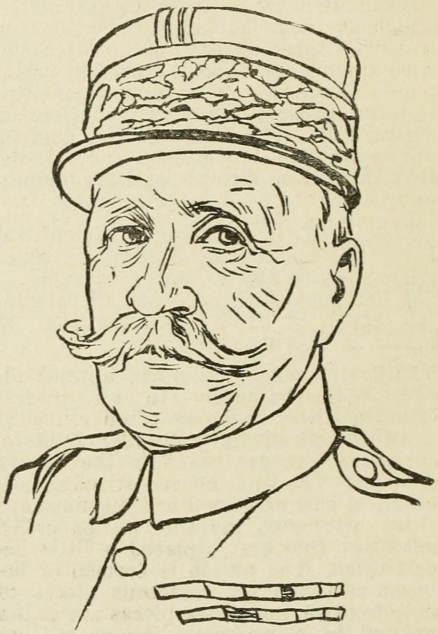
FLYING FISH, the name given to more than one fish which, having extended fins, leaps from the water and, after a more or less lengthened flight, drops into it again. The fins seem to act as parachutes rather than as wings. The common flying fish is *Exocætus volitans*. It belongs to the family *Esocidæ*. Another closely allied species is *E. exiliens*, the greater flying fish. Both have straggled to the North Atlantic waters. They are abundant in the Mediterranean.

FLYING SQUIRREL, a name given to such of the *Sciuridæ* (squirrels) as have the skin of the sides very much extended between the fore and hind legs, so as, to a certain extent, to sustain the animal in the air when taking long leaps. *Sciuopterus volans* is the only European species.

FOCH, FERDINAND, French general and supreme commander of the Allied forces operating against the Germans on the western front, in Belgium and France during the World War. He was born in Tarbes, 1851, the son of a minor departmental official under Napoleon III. Together with his two brothers he was educated in a local college, where he especially distinguished himself in geometry and the higher mathematics. Already at a very early age he was preparing himself for an army career. Leaving college, he entered the École Polytechnique, from which he graduated as an artilleryman. When the Franco-Prussian War broke out he was only nineteen, but served as a second lieutenant with the army against the Prussians. At the age of twenty-six, when a captain of artillery, he was appointed instructor in strategy and general tactics at the École de Guerre. Here he remained for five years, during which he established his reputation as little less than a genius as a teacher, a reputation which had spread so far and high that several years later, when he had reached the rank of brigadier-general, Clemenceau, who was then Premier, had him sent back to the École de Guerre as a director.

It was not so much his ability to impart information to the students that distinguished the teaching career of General Foch, but rather the spirit with which he permeated the whole institution. He was the very reverse of a dry tactician. He taught rather the art of war than its science; or, rather, he emphasized the human side of it. War, as he taught its principles, was not only a study of explosives and engineering, but the capacity to understand the psychology of the human brain under stress of the excitement of actual military operations. In his courses intuition played quite as important a part as mathematics. Briefly, he considered morale the most important element in successful warfare. How to inspire this, he taught quite as much by personal demonstration as by precept. This feature of his mode of instruction was more evident in his personal teaching than in his two books, "The Principles of War" and "The Conduct of War," both of which works have been translated into practically all European languages.

When the Germans invaded France, in August, 1914, thus beginning the five years' military operations on the western



MARSHAL FERDINAND FOCH

front, General Foch was in command of the Ninth Army. His remarkable achievements following, which gradually brought him to the highest rank on the side of the Allied forces, are historical, rather than biographical. His masterful defeat of the Germans under General von Bülow, on Sept. 8, 1914, known as "The Affair of the Marshes of St. Gond," wherein the Allies registered the first check to the oncoming invaders, was but the beginning of a series of such achievements.

In May, 1917, General Foch succeeded General Pétain as Chief of Staff of the French Army. On March 28, 1918, it was announced that the Allies had finally agreed to amalgamate their forces on the

western front under a single command, with General Foch as supreme director of operations. Henceforward, the coordination of the Allies equalled that of the Germans, and the defeat of the latter was assured. In the following October Marshal Foch, who still remembered vividly the experiences of the French during the Franco-Prussian War, had the supreme honor of receiving the German delegation which brought the surrender of the Central Empires into his hands.

FOCUS, in ordinary language, any place from which an influence emanates, or where that influence exists in very concentrated form. In optics, a point at which the rays of light refracted from a convex lens, or reflected from a concave mirror, are most concentrated; a point in which such rays meet, or tend to meet; if produced either backward or forward. In conic sections: (1) Singular (of a parabola): A point so situated that if from it there be drawn a line to any point in the curve, and another from the latter perpendicular to a straight line given in position, these two straight lines will always be equal to one another. (2) Plural: (a) Of an ellipse: Two points so situated that if two straight lines be drawn from them to any point in the curve, the sum of these straight lines will always be the same. (b) Of a hyperbola: Two points so situated that if two straight lines be drawn from them to any point in the curve, the excess of the straight line drawn to one of the points above the other will always be the same.

In astronomy, the term foci is often used in connection with the orbit of the earth, which is an ellipse, with the sun in one of the foci. In acoustics, the point of convergence of sound rays, these following the same laws as those of light and heat. Acoustic focus: The focus of sound rays. Calorific focus: The focus of heat rays. Conjugate foci: In optics, two foci so situated that, if rays of light diverging from one strike a concave mirror, they will be reflected and meet in the other. Luminous focus: In optics, the focus of light rays. Principal focus: In optics, the focus of parallel rays striking a concave mirror. Vertical focus: In optics, a radiant point behind a mirror, from which rays may be held to diverge more and more, and in which, looking at them now as coming from the opposite direction, and consequently as convergent, they would tend to meet. Magnetic foci: The two points on the earth's surface where the magnetic intensity is greatest; they nearly coincide in position with the magnetic poles.

FOG, a very thick mist; small hollow vesicles of water suspended in the air, but so low as to be but a short distance from the earth in place of rising high above it and becoming so illuminated by the sun as to constitute clouds of varied hue. Fogs often arise when the air above warm, moist soil is colder than the soil itself. The hot vapors from the ground are then condensed by coming in contact with the colder air above, as the warm steam of a kettle is by the comparatively cold air of a room. But no fog arises till the cold air has absorbed vapor enough to bring it to the point of saturation. Fogs often hang over rivers. Their cause is the condensation by contact with the cold water, of the vapor in a hot and moist air current passing over the river.

FOGAZZARO, ANTONIO (fō-gäts-är'ō), an Italian poet; born in Vicenza, Italy, in 1842. He first came into notice with "Miranda," a story in verse (1874), and added greatly to his reputation as a poet with "Valsonda," a volume of lyrics (1876). He was author of several novels which were received with marked favor, among them, "Master Chicco's Fiasco" (1885); "Daniel Cortis" (1887); "The Poet's Mystery" (1888); "The Saint" (1905); "Leila" (1910).

FOGGIA, a city of southern Italy, capital of the province of the same name, in the center of the great Apulian plain, 46 miles E. by S. of Campo Basso. It is well built, most of the houses being reconstructed since an earthquake, which happened in 1732. It has large storehouses for keeping corn, and is the place where the flocks that feed on the great plain of Apulia are registered. Pop. about 79,000.

FOGO, FUEGO, or **ST. PHILIP**, one of the Cape Verde Islands, in the Atlantic Ocean, and the highest of the group, being 9,760 feet above sea-level, and presenting the appearance of one single mountain, though, on the sides, there are deep valleys; area, 40 miles in circumference; pop. estimated, 16,000. It has no rivers, and a scarcity of fresh water prevails, yet it is one of the most fertile islands of the archipelago, producing excellent maize and fruits. Chief town, Nostra Senhora da Luz. Also the name of a port of entry, capital of Fogo Island, Newfoundland.

FÖHR (fer), an island in the North Sea, off the W. coast of Schleswig; area, 28 square miles; population mostly Frisians engaged in fishing, the capture of wild fowl, and agriculture.

FOIL, in fencing, a rod of steel, representing a sword, with a handle or hilt at

one end, and a leather button at the other to prevent accidents. Foils measure from 31 to 38 inches in length.

FOIL, a leaf or thin sheet of metal placed beneath transparent jewels to heighten their color and improve their brilliancy; also applied to those sheets of tin amalgam placed behind mirrors. They are made of copper, tin, and silvered copper. The sheet lead which is used for the lining of tea-chests is a species of foil. By extension, anything of another color, or of different qualities, which serves to adorn or set off a thing to advantage.

FOIX, GASTON III., COUNT DE and Viscount de Béarn, a French military officer; born in 1331; acquired the surname of Phœbus. He was handsome, accomplished, and brave, and spent his life in war and the chase. His first service in arms was against the English in 1345. During the revolt known as la Jacquerie he contributed to the rescue of the Dauphin at Meaux. He made war on the Count of Armagnac, and took him prisoner; was for a short time governor of Languedoc; and in 1390 magnificently entertained Charles VI. at his château of Mazères. Gaston was of excessively violent temper, and probably was guilty of the murder of his own son. He wrote a book on the pleasures of the chase, of which several editions were published. He died in 1391.

FOLCLAND, or **FOLKLAND**, the land of the people, that portion of Anglo-Saxon England which was retained on behalf of the community. It might be occupied in common or possessed in severalty, but could not become allodial estate or absolute private property except with the consent of the Witan or highest council in the land. From time to time large grants were made both to individuals and to communities; and land thus cut off from folcland was called bocland or "book-land." Ultimately the king practically acquired the disposal of it, and the remnant of folcland became crown lands.

FOLCMOTE, in Anglo-Saxon England, an assembly of the people to consult respecting public affairs.

FOLDVAR (ancient Sussuinum), a walled town of Hungary, on the slope and summit of a hill, on the right bank of the Danube, 49 miles S. of Budapest; pop. about 12,000.

FOLGER, CHARLES JAMES, an American jurist; born in Nantucket, Mass., April 16, 1818; settled in Geneva, N. Y., in 1831; was graduated at Hobart College in 1836; and was admitted to the bar in Albany, N. Y., in 1839. He became judge of the Court of Common Pleas of Ontario county in 1843; was a member of the State Senate in 1861-1869; elected associate judge of the State Court of Appeals in 1871; succeeded to the chief justiceship of that court in 1880; and was secretary of the United States Treasury in 1881-1884. In November, 1882, he was the Republican candidate for governor of New York, but was defeated by Grover Cleveland. He died in Geneva, N. Y., Sept. 4, 1884.

FOLIO, in printing: (1) The running number of the pages of a book. The even folios are on the left-hand pages, the odd upon the right. The folios of prefatory matter are frequently in lower case Roman numerals. (2) A sheet of paper once folded. (3) A book of the largest size, whose sheets are folded but once, four pages to the sheet; hence it is used generally for any large volume or work. In bookkeeping, a page or opening in an account book. In law, a certain number of words in legal documents. The number varies in the States; thus in some of them, as in England, in low law documents, conveyances, deeds, etc., the folio is 72 words; in chancery and parliamentary proceedings 90 words. In New York and other States 100 words constitute a folio.

FOLK, JOSEPH WINGATE, an American public official, born in Brownsville, Tenn., in 1869. He graduated from Vanderbilt University in 1890. In the same year he was admitted to the bar. After practicing for 4 years in Brownsville, he removed to St. Louis, and from 1900 to 1904 was circuit attorney of that city. During his term of office he exposed a vast amount of political and official corruption and prosecuted numerous bribery cases which attracted wide attention. In 1905 he was elected governor of Missouri. He was the author of many reform laws during his term of office. In 1913 he was appointed solicitor for the United States Department of State and from 1914 was chief counsel for the Interstate Commerce Commission. He was also general counsel for the St. Louis Chamber of Commerce. In 1918 he was the Democratic primary nominee for United States senator, but was defeated.

FOLKESTONE (fōk'ston), a fortified seaport town of England, in Kent co., 62 miles S. E. by E. of London, and 7 W. by S. of Dover. It possesses a spacious harbor and fine pier whence the tidal steamers sail twice a day to Boulogne on the French coast. It was the birthplace of William Harvey, the

discoverer of the circulation of the blood. Pop. about 35,000.

FOLKLORE, the science which embraces all that relates to ancient observances and customs, to the notions, beliefs, traditions, superstitions, and prejudices of the common people. Gomme's divisions are: (1) Traditional Narratives: (a) Folk-tales, (b) Hero Tales, (c) Ballads and Songs, (d) Place Legends; (2) Traditional Customs: (a) Local Customs, (b) Festival Customs, (c) Ceremonial Customs, (d) Games; (3) Superstitions and Beliefs: (a) Witchcraft, (b) Astrology, (c) Superstitious Practices and Fancies; (4) Folk-speech: (a) Popular Sayings, (b) Popular Nomenclature, (c) Proverbs, (d) Jingle Rhymes, Riddles, etc.

Folklore had indeed been observed and noted by countless writers from the Father of History downward, but it was not till after the beginning of the 19th century that its value for the elucidation of the social history of mankind had become apparent to thinkers, and its systematic study been seriously begun. Meantime the reawakening to natural poetry and to the beauty of free emotional expression in literature, which lay at the foundation of what it is usual to call Romanticism, had already commenced even in the 18th century, and the publication of Percy's "Reliques of Ancient English Poetry" (1765) had given a powerful impulse to Scott and others in England, to Herder, and to Arnim and Brentano in Germany, who found lying to hand a rich wealth of traditional poetry, the poetic value of which they fortunately had the eyes to see. But the study of folksongs really began with Scott's "Minstrelsy of the Scottish Border" (1802-1803). Popular traditions began to be valued duly just as they began to decline and disappear; but fortunately a plentiful crop had been gathered and put into writing beyond the risk of oblivion.

Such works as E. B. Tylor's "Primitive Culture" (1871), and G. L. Gomme's "Folklore Relics of Early Village Life" (1883), have shown us what significant constructive results may already be attained with the evidence we possess.

FOLLEN, ELIZA LEE (CABOT), an American author; born in Boston, Mass., Aug. 15, 1787. She was the wife of Charles T. C. Follen, whose memoirs she wrote (1842). Her other works are: "Well-Spent Hours" (1827); "Poems" (1839); "Anti-Slavery Hymns and Songs" (1855); "Twilight Stories" (1855); and "Home Dramas" (1859). She died in Brookline, Mass., Jan. 26, 1860.

FOLLICLE, a form of fruit placed by Lindley in his class *Apocarpi*. It differs from the legume in having but one valve instead of two. A flower of *Nigella*, or one of *Delphinium*, produces several such follicles. In anatomy, a follicle is a minute secreting bag, which commonly opens upon a mucous membrane; a simple gland. It is called also a crypt or lacuna.

FOMENTATION, the application of a liquid, such as water, generally warm, to a portion of the body to remove external or internal disease. The application is usually made by means of flannel, steeped in the liquid. If the water be charged with mucilaginous principles, it is called emollient; if with a narcotic one it is said to be sedative or anodyne.

FOND DU LAC, a city and county-seat of Fond du Lac co., Wis., on Winnebago lake, at the mouth of Fond du Lac river, and on the Chicago, Milwaukee, and St. Paul, the Chicago and Northwestern, and the Minneapolis, St. Paul and Sault Ste. Marie railroads; 60 miles N. W. of Milwaukee. There is steamboat connection through Winnebago Lake and Fox river with all the Great Lakes. Here are a high school, St. Agnes Hospital and Sanatorium, a court house, Grafton Hall (Prot. Epis.), several banks, and daily and weekly newspapers. It has manufactories of engines, machinery, flour, paper, carriages, lumber, leather, typewriters, drugs, candies, etc. Pop. (1910) 18,797; (1920) 23,427.

FONT, the vessel which contains the water for the purposes of baptism. The font is the only relic of our ancient architecture which in its form is at all analogous to the Grecian and Roman vases. Norman fonts are generally square or circular; the first frequently placed on five legs. The circular form continued to be much used during the early English period; so, occasionally, was the square. Throughout the continuance of the Decorated style, the octagon was generally employed, sometimes the hexagon. During the Perpendicular style, the octagon was almost always used. Until the Reformation, and occasionally after, dipping was practiced in England. Pouring or sprinkling was not unusual previous to the Reformation; for as early as the year 754, pouring, in cases of necessity, was declared by Pope Stephen III. to be lawful; and in the year 1311, the Council of Ravenna declared dipping or sprinkling indifferent; yet dipping appears to have been in England the more usual mode. Fonts were required to be covered and locked, and the covers were highly ornamented.

FONTAINEBLEAU (fon'tain-blō), a town of France, department of Seine-et-Marne, near the Seine, in the forest of the same name, 32 miles S. S. E. of Paris, and 8 S. by E. of Melun. Manufactures porcelain. Fontainebleau owes its celebrity, and indeed origin, to its palace, or château, a favorite residence of the French monarchs. This is a vast and superb pile, in fact, rather a collection of palaces of different architectural periods, than a single edifice. Saracenic, Tuscan, and Greek orders are intermixed and interspersed with that of the Renaissance, and with the most bizarre and dissimilar ornamentation; yet, on the whole, the structure has a striking air of grandeur and majesty. It is surrounded by magnificent gardens, and lies in the forest of Fontainebleau, a finely wooded tract of 42,500 acres, intersected by the Seine, and presenting a very varied and picturesque surface. The château of Fontainebleau has been the scene of many historical events. Philip IV., Henry III., and Louis XIII. were born in it; and the first-named monarch died here. It was here that Louis XIV. signed the Revocation of the Edict of Nantes, in 1685. It was visited by Peter the Great; Louis XV. espoused the daughter of Stanislaus, King of Poland, in this palace; Pope Pius VII. was confined within its walls for 18 months; and it is intimately connected with the history of Napoleon, who made it his favorite residence. He signed his abdication in the palace, in 1814. It was comparatively neglected by Louis XVIII. and Charles X.; but Louis Philippe restored it to somewhat of its ancient grandeur. In 1837 the nuptials of the Duc d'Orleans were celebrated here with great pomp. Under Napoleon III. the palace was still more enlarged and embellished, and became the scene of luxurious autumnal fêtes, rivalling those of the days of Louis XIV. The forest of Fontainebleau became famous during the 19th century as the resort of many famous French painters of the modern school, Rousseau, Corot, Diaz, Millet, etc. Pop. about 15,000.

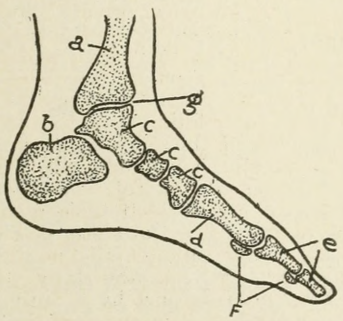
FONTENOY, BATTLE OF, one of the most famous battles in the War of the Austrian Succession. It was fought at a small village of the same name, in western Belgium. Here, May 11, 1745, the French under Marshal Saxe defeated the Allies under the Duke of Cumberland, with very heavy loss on both sides.

FOOD, any substance which, taken into the body, is capable of sustaining or nourishing, or which assists in sustaining or nourishing the living being. Foods may be classed under three heads, gaseous, liquid, and solid, the first two consisting of the air we breathe—the oxygen of which is so essential to life—and the water we drink. Milk, tea, coffee, cocoa, etc., are popularly called liquid food, but each of these is simply water in which various solid substances are dissolved, or held in suspension. The solid foods are of three kinds — viz., nitrogenous, non-nitrogenous, and mineral. Nitrogen compounds, or flesh formers, are essentially composed of carbon, hydrogen, oxygen, and nitrogen. They possess the only ingredients capable of building up and repairing the nitrogenous tissues of the body, but they also furnish a limited supply of heat, especially when heat-giving compounds are deficient in the body. Nitrogenous compounds are found both in the animal and vegetable kingdoms under the forms of albumen, fibrin, casein, gelatine, and chondrin. Non-nitrogenous compounds, or heat givers, sometimes called carbonaceous compounds, are composed of carbon, hydrogen, and oxygen. They serve to keep up the heat of the body, and so produce energy or force; but they contribute, also, to the repair and growth of the body. The chief heat givers are starch (abundant in the cereal grains), sugar, and fat. None of these substances will of itself sustain life. The mineral foods are the salts of soda and potash, the phosphates of lime and magnesia, iron, etc. As the daily waste of the body must be met by a daily supply of nourishment, it becomes of the utmost importance that such supply should consist of both flesh formers and heat givers, and in the proportion of two parts of the former to six of the latter. The National Pure Food Law, which went into effect in the United States Aug. 1, 1900, was aimed against ADULTERATION (*q. v.*). See NUTRITION; CONSERVATION OF FOOD.

The food of animals is not directly derived from inorganic nature, but mediately through the agency of plants. Plants can feed on and assimilate inorganic matter, in this respect differing from animals. A few plants, however, such as fungi, the sundew (*Drosera*), and Venus' fly trap, require animal food. The ordinary food of plants consists of carbon, water, and nitrogen.

FOOT, that part of the lower extremity below the leg on which we stand and walk. It is composed of three series or groups of bones—the tarsal, or hindermost; the metatarsal, which occupy the middle portion; and the phalanges, which form the toes. The tarsal bones are seven in number. Above, they are connected with the tibia and fibula bones of the leg, and below from the

heel and the hinder part of the instep. They are the astragalus, which articulates with the tibia and fibula; the os calcis, or bone of the heel; the os naviculare, or scaphoid bone, on the inner side of the foot, articulating with the astragalus; the os cuboides, on the outer side of the foot, articulating with the os calcis, the three cuneiform or wedge-shaped bones (the internal, middle, and external) in front of the scaphoid bone, near the middle of the foot. The metatarsal bones are five in number, and belong to the class of long bones. They are connected posteriorly with the tarsal, and anteriorly with the phalangeal bones. One is attached to each of the cuneiform bones, and two to the os cuboides; and they diverge slightly outward as they proceed forward. Their anterior ends form the balls of the toes. The first metatarsal bone is the shortest and strongest, while the second is the largest



CROSS SECTION OF HUMAN FOOT

A. Tibia
B. Bone of the heel
C. Tarsal bones
D. Metatarsal bones
E. Phalanges
F. Sesamoid bones
G. Ankle joint

—the others all decreasing in length according to their distance from it. These bones form the anterior portion of the instep. The phalanges, or bones of the toes, are 14 in number, three to each toe, except the great one, which has only two. The upper ones, which are longest and largest, are named the metatarsal; the next, the middle; and the most anterior, the ungual phalanges. The bones of the foot, more particularly those that compose the tarsus and metatarsus, are firmly connected together, so that they are not liable to be displaced; and those parts where they articulate with one another being covered with a tolerably thick layer of highly elastic cartilage, they possess a considerable degree of elasticity. They are bound together in various directions, by a number of ligaments, one of the principal of which is the plantar ligament, which is of great strength, and passes through the under surface of the heel-bone near its extremity, forward to the ends of the metatarsal bones. The movements of the foot, which are permitted by the connecting ligaments, are effected by a variety of muscles. The principal movements are: (1) That at the ankle, formed by the tibia and fibula with the astragalus, by which the foot is bent and straightened; (2) between the astragalus and os calcis, by which the foot is rolled inward and outward; (3) between the first and second range of tarsal bones, admitting of a very slight motion, by which the arch of the foot may be somewhat increased or diminished. Besides these there are the less complicated movements of the metatarsal and phalangeal bones. The foot is usually so much interfered with in civilized life as to be deprived of much of its beauty, and even of its utility; its movements being impeded by its being confined in tight-fitting boots, to the shape of which feet are made to conform.

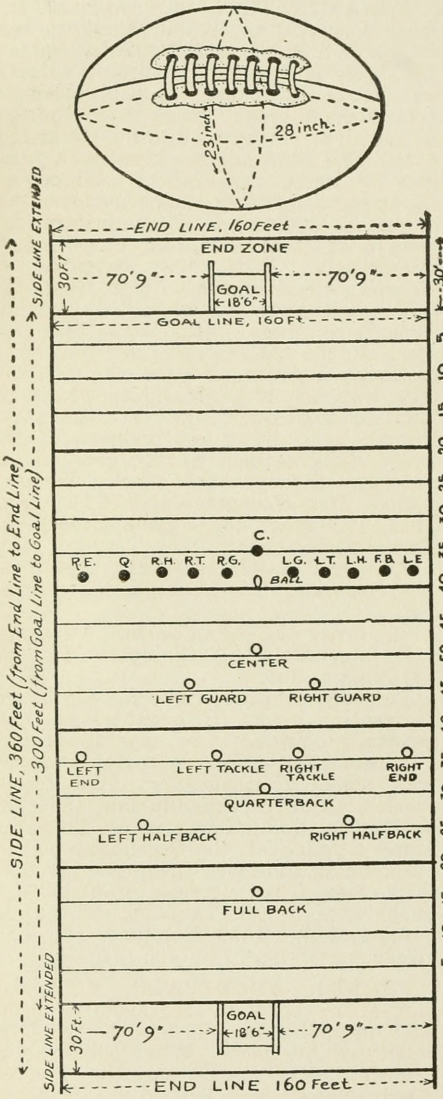
In poetry, a foot is a meter, or measure, composed of a certain number of long and short syllables. Some are dissyllabic, consisting of two feet, as the spondee, iambus, trochee; and some trisyllablic, as the dactyl, anapest, tribrach. These are what are called simple feet. There are others, consisting of four, five, or six syllables, which are reckoned double or compound feet, but which are commonly resolved into single feet.

In arithmetic, a measure of length, consisting of 12 inches, or 36 barleycorns laid end to end. It also expresses surface and solidity. A square foot is the same measure both in length and breadth, containing $12 \times 12 = 144$ square or superficial inches. A cubic or solid foot is the same measure in all directions, or 12 inches long, broad and deep, containing $12 \times 12 = 144 \times 12 = 1{,}728$ cubic inches to the solid or cubic foot. As this term is employed in almost all languages as a linear measure, it has doubtless been derived from the length of the human foot. Though the denomination is the same, the measure itself varies considerably in different countries.

As a military term, soldiers who march and fight on foot; infantry; as, horse and foot.

FOOTBALL, a field game played in the United States, Great Britain, Canada, and Australia. The game is said to have originated among the Romans, but it was under the guidance of the public schools of Great Britain that it advanced and became popular. There are at the present time several styles of football, the American and English, Rug-

by, and the Association games, being the most popular. The American Rugby game is played among the colleges, schools, and athletic clubs of the United States. The game is played on a field 360 feet long by 160 feet wide, the boundaries being marked off with white lines,



FOOTBALL—DIAGRAM OF FIELD OF PLAY

Black players about to start play. White players in defense positions

with lines at every five yards, running across the field. Two goal posts are placed 18 feet 6 inches apart in the middle of each end line. These posts are 20 feet high and have a cross bar 10 feet from the ground. The ball has an oval-shaped leather covering containing an inflated rubber bladder. The football team consists of 11 men, (1) the center, (2) two guards, (3) two tackles, (4) two halfbacks, (5) two ends, (6) the quarterback, and (7) the fullback. The game is commenced by one team placing the ball on the center of its 40-yard line and kicking it into the opponents' territory. One of the opponents catches it, and runs forward until tackled and thrown. The ball is then put down for scrimmage. The center of the team holding the ball passes it back between his legs to a runner. When the runner is stopped the referee signals "down," and the ball is held. The team is allowed four downs, in which it must advance the ball 10 yards or surrender the ball to its opponents. The ball may also be advanced by the forward pass (throwing ball toward goal), by punting (dropping ball and kicking before it reaches ground), and by drop kicking. The game continues until one team carries the ball over its opponents' goal line. This is called a touchdown, and scores 6 points. One of the team then tries to kick the ball over crossbar and between opponents' goal posts by a direct place kick (kick from where it rests). This kicked goal counts 1 point. The ball is then taken out to the 40-yard line and kicked off again by either team, at loser's option. A goal from field (made—not on kick-off—by place kick or drop kick, i. e. dropped ball kicked the instant it rises) counts 3 points; a safety (bringing ball over one's own goal), 2 points for opponents. The game is played in four periods of 15 minutes each, with a 1 minute intermission, but 15 minutes between halves.

The rules are somewhat modified every year, the tendency being to bring about open rather than mass play.

The English game (15 men) is more open, more kicking being done, but does not develop team work and interference to any great extent.

In the Association (or soccer) game a spherical ball is advanced entirely by kicking or propulsion by head or body, the hands being used only by goal keeper. The team consists of five forwards, three halfbacks, two fullbacks, and a goal keeper. The goals are made by kicking ball between goal posts, 8 yards apart, and *under* a bar 8 feet from ground. The game is decided by the number of goals scored. The tendency in recent times has been to make the game faster by bringing every man into full play.

FOOTE, ANDREW HULL, an American naval officer; born in New

Haven, Conn., Sept. 12, 1806; entered the navy as a midshipman in 1822. In 1849-1852 he was engaged in the suppression of the slave trade on the coast of Africa. In command of the China station in 1856, when the Chinese and English were at war, he exerted himself to protect American property, and was fired upon by the Celestials. His demand for an apology was refused and he stormed and captured four Chinese forts, killing and wounding 400 of the garrisons of 5,000 men. In 1861 he commanded the expedition against Forts Henry and Donelson on the Tennessee and Cumberland rivers, and directed the attack on Island Number 10. In 1862, he was promoted rear-admiral, and in 1863 was ordered to take command of the South Atlantic Squadron, but died in New York while preparing to join his flag-ship, June 26, 1863.

FOOTE, MARY (HALLOCK), an American author; born in Milton, N. Y., Nov. 19, 1847; married a mining engineer. She was the author of several novels and collections of short stories illustrated by herself, on life in the Rocky Mountain regions: "The Led Horse Claim" (1883); "John Bodewin's Testimony" (1886); "Cœur d'Alene" (1894); "The Cup of Trembling and Other Stories" (1895); "The Little Fig Tree Stories" (1899); "The Prodigal" (1900); "A Touch of Sun" (1903); "The Royal Americans" (1910); "Picked Company" (1912); "Valley Road" (1915).

FOOTE, SAMUEL, an English actor; born in Truro, England, Jan. 27, 1720. From Oxford he went to London to study law, but had to go on the stage for a living; tried tragic parts and failed; then began to give entertainments, impersonating real and imaginary people and acting little farces by himself. He wrote farces, 22 in number; the most notable being "The Minor" (1760), a skit at the Methodists; "The Liar"; "The Mayor of Garratt." He died in Dover, England, Oct. 21, 1777.

FOOTSCRAY, a city of Victoria, Australia. It is a suburb of Melbourne and has manufactures of sugar, soap, woolen goods, chemicals, machinery, etc. In the neighborhood are important bluestone quarries. Pop. about 25,000.

FORAKER, JOSEPH BENSON, an American statesman; born near Rainsboro, O., Jan. 5, 1846; enlisted as a private in the 89th Ohio Infantry and served till the end of the Civil War. He was graduated at Cornell University in 1869, and began law practice in Cincinnati, in the same year. He was judge of the Superior Court of Cincinnati in 1879-1882, governor of Ohio in 1885-1887 and 1887-1889, and was United States Senator in 1897-1903. He ran for senator in 1914 against Warren G. Harding and was defeated. He died in 1917.

FORAMINIFERA, an order of animals belonging to the sub-kingdom *Protozoa*, and the class RHIZOPODA (*q. v.*). The body is contained within a calcareous test or shell, which is polythalamous (many-chambered). It may be cylindrical or spiral, or it may tend to the pyramidal form. The outer surface presents a punctate or dotted appearance, produced by the presence of very numerous foramina, or small apertures. Foraminifers are always of small size, and often indeed microscopic. With the exception of *Gromia*, which occurs both in fresh and salt water, they are exclusively marine. Sometimes their shells constitute sea sand. In the Atlantic, at a depth of 3,000 fathoms, there is an ooze composed almost entirely of *Globigerinæ*, which belong to this order; the stratum thus formed is a direct continuation of the white chalk deposit, having gone on apparently through the whole Tertiary period. Drs. Carpenter and Parker, and Prof. T. Rupert Jones have divided the *Foraminifera* thus:

Sub-order I.—*Imperforata*. Families: (1) *Gromida*, (2) *Miliolida*, (3) *Lituolida*.

Sub-order II.—*Perforata*. Families: (1) *Lagenida*, (2) *Globigerinida*, and (3) *Nummulinida*.

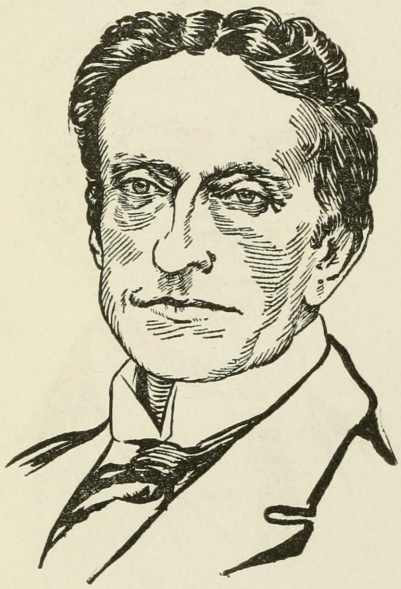
The exceedingly antique *Eozoön* of the Laurentian rocks, if organic, as it is generally believed to be, was apparently a foraminifer. Forms more unequivocal, some of them very like recent species, occur in the Silurian, the Carboniferous, and other strata. They are found through all the Secondary period, chalk being almost entirely composed of their cases. They increase in number and importance in the Tertiary. The nummulites of the Midde Eocene are foraminiferous animals.

FORBES, ARCHIBALD, a British journalist; born in Morayshire, Scotland, in 1838; was educated at the University of Aberdeen. When the Franco-Prussian War broke out the London "Daily News" sent him to the front as war correspondent, in which capacity he impressed on his work a new and distinctive character and style. In 1875 he was sent to report the incidents of the Indian tour of the Prince of Wales. Subsequently he watched the course of events in Servia; described the war with Turkey; and went to India to report the

AfghanWar, and to South Africa for the Zulu War. Afterward he revised his letters and reports, and recast them into historical narratives of the various campaigns. He died in London, March 29, 1900.

FORBES, WILLIAM CAMERON, an American public official, born in Milton, Mass., in 1870. He graduated from Harvard in 1892, and entered the banking business, becoming a partner in the banking firm of J. M. Forbes & Co. From 1904 to 1908 he was a member of the Philippine Commission and secretary of commerce and police in the government of the Philippine Islands. He was successively vice-governor and governor-general, resigning the latter position in 1913.

FORBES-ROBERTSON, SIR JOHNSTONE, an English actor, born in London in 1853. His early years were spent



FORBES-ROBERTSON

as a painter. He went on the stage at the age of 21, and at once exhibited unusual talent. He acted as leading man for Sir Henry Irving and Sir Squire Bancroft. In 1895 he appeared with Mrs. Patrick Campbell in "The Notorious Mrs. Ebbsmith." In the same year he began his career of manager in London, playing the part of Romeo in "Romeo and Juliet," following this with "Othello" and "Hamlet." In the latter he scored a great success. He made frequent tours to the United States, where he appeared in Shakespearean plays, several plays by George Bernard Shaw, and others. He was recognized as one of the most distinguished actors of his time. He was knighted in 1913.

FORCE, in physics, an influence or exertion which, if made to act on a body, has a tendency to move it when at rest, or to affect or stop its progress if it be already in motion. The strength of man's arms is a force, so is the power of a horse or ox to pull a vehicle, or turn a wheel, or set in action an agricultural machine. Gravity, friction, elasticity of springs or gases, electrical or magnetical attraction or repulsion are forces. Accelerated force is the increased force which a body exerts in consequence of the acceleration of its motion. Active force is force which tends to move another body from a state of rest. Animal force is the muscular strength of man, horses, asses, cattle, or other animals viewed as a moving power.

Composition of forces is produced by two other forces acting on a body. If they operate in the same direction the resultant or the resulting force will be the sum of both. If the two forces act in opposite directions and are equal, they will make the body remain at rest; and if they are unequal, they will move in the direction of the greater force; and with a force equivalent to their difference. If the lines of direction make an angle with each other, the resultant will be a mean force in an intermediate direction. If many forces act, the resultant is the line of motion or state of rest produced by their conjoint action. Resolution of forces is the decomposition of a force into the forces which have combined to produce it.

The theory of the conservation of force, or of energy, is the doctrine or principle that in all cases force is conserved—*i. e.*, kept in existence even when it appears to perish. Just as a certain definite amount of matter exists in the universe, to which man cannot add, and from which he cannot subtract an atom, so a definite amount of force, incapable of being increased or diminished, exists like the former, in the universe. It can, however, be transformed so as to look quite unlike its former self; but in every case the force or energy communicated to a body or system of bodies is withdrawn from some fund of energy previously existing. The theory of the correlation of force, or energy, is the doctrine or principle that the different kinds of force in the universe are so correlated together that any one can be transformed into an exactly equivalent amount of another. There is equality when one can do precisely the same amount of

work as any other. It has long been known that in a machine, the screw for example, what is gained in power is lost in velocity, and vice versa. At first sight motion and heat seem to have no relation to each other; but if a moving body be suddenly arrested in its career, as, for instance, a bullet by a target, heat will be generated, and the same number of units of the work which the motion was capable of effecting can be achieved also by the heat. Conversely, a certain amount of heat can produce an equivalent one of motion; thus the working energy communicated to the piston of a steam engine is withdrawn from the heat of the steam, and exactly balances the latter.

By equilibrium of forces is meant the action of forces which, balancing each other, produce an equilibrium or state of balance, or rest in the body or bodies on which they operate. An impulsive force is a force which acts on a body for an unappreciably short time, as when one body strikes another. Kinetic force is the actual force excited by a moving body as distinguished from the potential forces which it is capable of creating. Potential force is the whole force which a body in motion can exert, as distinguished from the kinetic force which it is exerting at the specific moment of time. The measure of force is the measurement of the magnitude of a force, which is done by noting the momentum which it communicates to a body in a unit of time. The unit of force is the force which acting on a pound mass would, in one second, produce a velocity of a foot per second. Mechanical force is force of a mechanical nature acting on material bodies. It may be either that of the active force of a body in motion, or the tension or resistance opposed by a body at rest. Molecular forces are those which by means of certain attractions and repulsions retain the atoms of matter side by side without their touching each other. When a force tends to produce rotation about a fixed point the tendency is called MOMENT.

FORCE PUMP, a pump which delivers the water under pressure, so as to eject it forcibly or deliver it at an elevation. The term is used in contradistinction to a lift pump, in which the water is lifted, and simply runs out of the spout. The single-acting force pump is that in which the lift and delivery are alternate. The double-acting is that in which the passages are duplicated, so that a lift and delivery are obtained by each motion of the plunger; the pump has a distinct water-way both above and below the piston, so as both to draw and force water at each stroke, and thus cause a continuous stream, which is rendered more uniform by an air-chamber. Also the boiler-supply pump sometimes connected to the piston rod of the cylinder of a locomotive.

FORD CITY, a borough in Pennsylvania, in Armstrong co. It is the center of an important agricultural and coal-mining region and its industries include the manufacture of plate glass. Pop. (1910) 4,850; (1920) 5,605.

FORD, HENRY, an American capitalist and philanthropist, born at Greenfield, Mich., in 1863. After attending a district school he learned the machinist's trade and moved to Detroit to secure employment. After securing notable successes in his vocation he became chief engineer of the Edison Illuminating Co. and in 1903 organized the Ford Motor Co., which became the largest automobile company in the world. In the conduct of his plant he achieved great success partly by his enlightened attitude toward his employees, granting them high wages, making them profit-sharers in the plant, and maintaining for their benefit hospitals and schools. In 1915 he financed a group of peace advocates which attempted to influence the belligerent powers to end the World War. After the war he was among the first



HENRY FORD

to announce a reduction in the prices of his goods in order to reduce the high cost of living. He was defeated for the United States Senate in 1918 by Truman H. Newberry.

FORD, HENRY JONES, an American educator, born in Baltimore in 1851. He graduated from Baltimore City College in 1868. In 1872 he became an editorial writer on the Baltimore "American" and for several years acted as editor for papers in New York, Pittsburgh, and Baltimore. He was lecturer on political science at Johns Hopkins University in 1906-1907. In 1908 he was appointed professor of politics at Princeton. He wrote "The Rise and Growth of American Politics" (1898); "The Scotch-Irish in America" (1915); "Woodrow Wilson, the Man and His Work" (1916); "The Cleveland Era" (1919). He was a frequent contributor on economic subjects to magazines.

FORD, JOHN, an English dramatist; born in Islington, England, in April, 1586. He turned from law to devote himself to the drama. His first poem was "Fame's Memorial," an elegy on the Earl of Devonshire. Alone and in collaboration he wrote a series of very successful plays. As a poet he ranks among the foremost outside of Shakespeare. Among his best plays are: "The Lover's Melancholy," "The Broken Heart," and "Love's Sacrifice." He died about 1640.

FORD, PAUL LEICESTER, an American author; born in Brooklyn, N. Y., in 1865. His works include: "The Honorable Peter Stirling" (1894); "The True George Washington" (1896); "Bibliotheca Hamilton"; "Franklin Bibliography"; "The Works of Thomas Jefferson" (1897); "The Story of an Untold Love"; "Tattle Tales of Cupid"; "Janice Meredith" (1899), etc. He died in 1902.

FORD, WORTHINGTON CHAUNCEY, an American statistician; born in Brooklyn, N. Y., Feb. 16, 1858; was chief of the Bureau of Statistics, Department of State, in 1885-1889, and of the Bureau of Statistics in the Treasury Department in 1893-1898; became connected with the Boston Public Library in 1897; was chosen Lecturer on Statistics in the University of Chicago in 1901. He was the author of "American Citizen's Manual"; "The Standard Silver Dollar" (1884) and "George Washington" (1899); "Journal of Continental Congress" (1905); "Life and Writings of John Quincy Adams" (1913).

FORDHAM UNIVERSITY, a Roman Catholic institution for higher education, formerly known as St. John's College. The latter institution was opened in 1841 as the New York Diocesan College and Seminary. It then included St. Joseph's Seminary and a college department. The seminary was in 1864 removed to Troy, and in 1896 to Dunwoodie. In 1907 the charter of the college was amended to authorize the establishment of law and medical departments, and at the same time the name was changed to Fordham University. It is situated in Fordham, N. Y. In 1919 there were 201 instructors and 3,209 students. The president is Rev. E. P. Tivnan, S. J.

FORECASTLE, a short deck placed in front of a ship above the upper deck. It is generally terminated at each end, in ships of war, by a breastwork, the foremast part reaching to the beak-head, and the after portion reaching to the fore-chains. This part of a ship used to be very much elevated in former times, for the accommodation of archers and cross-bowmen; whence the term forecastle.

FOREIGN WARS, MILITARY ORDER OF, a hereditary, patriotic organization formed in New York in 1894. During the first year it was known as the Military and Naval Order of the United States, but the name was changed to its present one in 1895. The foreign wars referred to are the War of the Revolution, the War with Tripoli, the War of 1812, the Mexican War, and the War with Spain—and the objects are to preserve the names of those engaged in them and collect the records. The members include Veteran Companions, consisting of commissioned officers of the army, navy, and marine corps, who took part in the wars, and Hereditary Companions, descendants of commissioned officers who so participated. When the World War broke out the State commanderies numbered 20, and the membership was over 1,500.

FORELANDS, NORTH and **SOUTH**, two headlands on the S. E. coast of England, and on the E. seaboard of the county of Kent: the first, or North Foreland, forms the N. E. angle of the county; it projects into the sea in the form of a bastion, and consists of chalky cliffs nearly 200 feet in height. A lighthouse of the first class, having a fixed light elevated 340 feet above the level of the sea, was erected on this promontory in 1688. The South Foreland, about 16 miles S. of the former, consists also of chalky cliffs, and has two lighthouses, with fixed lights, erected upon it, to warn ships coming from the S. of their

approach to the Goodwin Sands. The North Foreland is made, by Act of Parliament, the S. E. extremity of the port of London.

FOREORDINATION, or **PREDESTINATION**, according to the Calvinistic view, the predestination before the foundation of the world of some to eternal life and others to eternal death. In the authorized version of the Scriptures, the word foreordination does not appear at all, and the word foreordain does not occur in this sense, but ordain does: "And as many as were ordained to eternal life believed" (Acts xiii: 48); "Who were of old ordained to this condemnation" (Jude 4, 13).

FOREST CITY, a borough of Pennsylvania, in Susquehanna co. It is on the Delaware and Hudson, the Erie, and the New York, Ontario, and Western railroads. Its chief industries are coal mining and the manufacture of silk. It is also the center of an important agricultural region. Pop. (1910) 5,749; (1920) 6,004.

FOREST PARK, a city of Illinois, in Cook co. It is 4 miles beyond the city limits of Chicago. It is on the Chicago Great Western, the Baltimore and Ohio, Chicago Terminal, and the Minneapolis, St. Paul and Sault Ste. Marie railroads. It is also on the Des Plaines river. The town is a suburb of Chicago, and within its borders are several cemeteries. Pop. (1910) 6,594; (1920) 10,768.

FORESTERS, INDEPENDENT ORDER OF, a benevolent and fraternal organization founded at Newark, N. J., in 1874 and reorganized in 1881. The order has members throughout the United States and Canada, with branches in Great Britain, France, Norway, Australia, and India. The responsibility for government is vested in a supreme court which sits in Toronto, Can., while high courts attend to the affairs of the order in the different States of the Union and in countries where branches exist. The number of members is now about 260,000, and the disbursements have amounted to over $50,000,000. In the United States there are a high court, and about 4,200 subordinate courts.

FORESTRY, the act, occupation, or art of forming and cultivating forests; the systematic utilization, reproduction and improvement in productive capacity of trees in masses, including the planting and culture of new forests. Not only private interest exists in forests but a public interest, which necessitates at times governmental action. Such action rests on the following principles: (1) The widest scope should be allowed to private enterprise in production, care being taken that abundant statistics in regard to supply and demand and opportunity for education on the subject be furnished. (2) Adequate legal protection should be given to forest property. (3) Whenever improper management threatens damage to neighboring property the State should interfere to enforce proper management. (4) Wherever public welfare demands the reforestation of denuded tracts, the State should assist individual or communal enterprise in performing this, or else do the reforesting as a work of internal improvement. (5) In cases where a permanent forest is desirable and private interest can not be relied on for its proper management, the State should own and manage it.

There were, in 1920, 152 National Forests, embracing 180,299,776 acres, of which a little over 86 per cent. is public land. By the act of February 26, 1919, the Grand Canyon National Park was created. For this purpose 606,720 acres were transferred from other National Forests. For a discussion of conservation of forest lands, see CONSERVATION. See also NATIONAL PARKS, and FORESTRY ASSOCIATION, AMERICAN.

FORESTRY ASSOCIATION, AMERICAN. An association organized in 1882 and incorporated in 1897, having among its purposes the promotion of a business-like use of the forest resources of the United States, the advancement of legislation to that end and the inauguration of forest administration by the Federal Government and States, and the diffusion of knowledge in respect to the conservation and utilization of forests. As a result of its work committees have investigated forest conditions and issued reports of great value in forest renewal and management. The members number over 5,000. The headquarters are in Washington, D. C., and there a magazine, "American Forestry," is issued each month.

FOREY, ÉLIE FRÉDÉRIC, a French military officer; born in Paris, France, Jan. 10, 1804; was admitted to the Military School of St. Cyr in 1822. He took part in the first expedition to Algiers, and distinguished himself at the battle of Medeah, in the retreat which followed the first siege of Constantine, and at the Iron Gates. In 1840, he went through four other African campaigns, and returned to France with the rank of colonel in 1844, became a general in 1848, took an active part in the coup d'état of December, 1851, and was made a general of division and commander of the Legion of Honor in 1852. At the breaking out

of the war with Russia, he was placed on the reserve division of the Army of the East, and for a time held the command of the siege force before Sebastopol. In 1857 he was nominated to the first division of the army of Paris. He commanded this division during the Italian War in 1860, gained at Montebello the first battle of the campaign, and distinguished himself at Magenta and Solferino, being wounded at the latter. When the expedition to Mexico was decided upon in 1861, Forey received the command of the French troops. After several sanguinary engagements, he attacked and stormed the strong post of Puebla, thereby throwing open the road to the city of Mexico. For this service he was made Marshal of France, when he resigned his command to General Bazaine, and returned home, receiving the command of the 2d army corps in 1863. He received the Grand Cross of the Legion of Honor in 1859, and was elected to the Senate in that year. He died in Paris, France, June 20, 1872.

FORFARSHIRE, or **ANGUS**, a maritime county of Scotland, in the east midland division. It has an area of 873 square miles. The surface is for the most part irregular and intersected with hills. It is an agricultural and stock-raising county. Its chief industries are the manufacture of jute and linen. Pop. about 285,000. The capital is Forfar.

FORFEITURE, in English law, is a punishment annexed to some illegal act or negligence in the owner of real property, whereby he loses all his interest therein, and it goes to the party injured, as a recompense for the wrong which either he alone or the public with him has sustained. Forfeitures are either civil or criminal. Civil forfeiture takes place when some alienation is made contrary to law, as in mortmain; or when a particular tenant aliens for a larger estate than he himself has, as when a tenant for life makes a conveyance in fee. Forfeiture for criminal causes takes place in treason or felony, and for one or two other offenses.

Forfeiture by alienation is almost unknown in the United States, and the just principle prevails that the conveyance by the tenant operates only on the interest which he possessed, and does not affect the remainder man or reversioner. Under the Constitution and laws of the United States, forfeiture for crimes is nearly abolished; and when it occurs, the State recovers only the title which the owner had. An estate may be forfeited by a breach or non-performance of a condition annexed to the estate, either expressed in the deed at its original creation, or implied by law, from a principle of natural reason.

FORGE, the apparatus or works for heating bars of iron and steel and working them under the hammer. Works in which cast iron from the blast furnaces is converted into malleable iron by puddling and subsequent hammering, and also where the native ores of iron are reduced without fusion to the metallic state, are also called forges. Forges are required of various dimensions, and are often adapted to special uses. Portable forges are used in many workshops. For forging heavy articles, as anchors, wrought-iron shafts for ocean steamers, etc., powerful machinery is required, adapted to the nature of the work to be done. Morrison's steam hammer, with which a bar of iron can be forged of any size or thickness, is one solid wrought-iron hammer bar, piston head and head for hammer face forged solid, with the bar passing through both ends of the cylinder, prevented from turning by the upper cylinder head. No guides below the cylinder. Slide-valve balanced. Double-acting hammers of all sizes, taking steam above and below the piston, with self-acting valve gear and hand movement, can be changed at will while in operation, thus affording complete control over its movements. Hammers of 2,000 pounds and under have one upright only; those over this size, two. In puddling iron, when the mass of cast-iron has been sufficiently purified in the furnace by burning out its carbon and other impurities, it is placed under the heavy forge hammer, which squeezes out the liquid slag and forces the softened particles of iron to cohere into a continuous oblong mass or bloom. When iron is extracted from rich ores without first being converted into cast-iron, the forge hammer is used to force the spongy mass of reduced ore into a compact bar of malleable iron.

FORGES, a small village in France, about eight miles N. W. of Verdun, which figured prominently in the first attack by the Germans on Verdun, in March, 1916. It was taken and re-taken several times by both sides, but on that occasion was finally held by the Germans, who pressed on toward the main French position at Mort Homme. During these operations the village was almost entirely destroyed by gunfire.

FORGET-ME-NOT, *Myosotis palustris*, the creeping water scorpion grass, a boraginaceous plant about a foot high. The flowers are bright blue, with a yellow eye and a small white ray at the base of each segment. It is found abun-

dantly in ditches and the sides of rivers, flowering from June to August. The name is also applied to *Myosotis arvensis*, *Veronica chamædrys*, and *Ajuga chamæpitys*.

FORK, an instrument divided at the end into two or more points or prongs, and used for lifting or pitching anything. The instrument used at table is only about three centuries old. The Greeks, Romans, and other ancient nations knew nothing of table forks, though they had large forks for hay, and also iron forks for taking meat out of pots. The use of any species of forks at the table was quite unknown till the 15th century, and they were then known only in Italy, which has the merit of this invention. None of the sovereigns of England had forks till after the reign of Henry VIII.; all, high and low, used their fingers. The first royal personage in England who is known to have had a fork was Queen Elizabeth; but it remains doubtful whether she used them on ordinary occasions. As late as the middle of the 17th century forks were used in England only by the highest classes. The general use of silver forks in Great Britain cannot be dated farther back than beginning of 19th century.

In machinery, a fork is a short piece of steel which fits into one of the sockets or chucks of a lathe, used by wood-turners for carrying round the piece to be turned; it is flattened at the end like a chisel, but has a projecting center point, to prevent the wood from moving laterally.

FORLI (ancient Forum Livii), a walled city of central Italy, capital of province of same name, in a fertile plain between the Montone and Ronco, on the Emilian Way, 38 miles S. E. of Bologna, and 15 S. W. of Ravenna. Manufactures, silk ribbons and twist, oil-cloth, woolens, wax, niter, and sulphur. In 1797 Forli was taken by the French, who made it the capital of the department of Rubicon. In 1860 it was annexed to the kingdom of Italy. The collection of paintings in the municipal Pinacoteca is important. Pop. of commune, about 46,000.

FORMALDEHYDE, HCO·H, formic aldehyde, methyl aldehyde; obtained when a current of air, charged with the vapor of methyl alcohol, is directed on an incandescent spiral of platinum wire. The liquid collected reduces nitrate of silver, forming a mirror; a small quantity is formed by the action of the silent electric discharge on a mixture of hydrogen and carbon dioxide, $CO_2+2H_2=H\cdot CO\cdot H+H_2O$.

FORMAMIDE, $H\cdot CO\cdot NH_2$, the amide of formic acid, obtained by the dry distillation of formate of ammonium, or by heating two parts of dry ammonium formate with one part of urea to 140°, till no more ammonium carbonate is given off. It is a liquid which distills in a vacuum at 150° at ordinary pressure, at 195° with partial decomposition: when quickly heated, it is decomposed into CO and NH_3.

FORMICA, ant, the typical genus of the family FORMICIDÆ (*q. v.*). It has the footstalk of the abdomen composed of a single joint; the mandibles are triangular, and denticulated at the edge. The females are destitute of a sting. Of these *F. sanguinea* makes its nest in wood, and is a slave holder, carrying off the young of other species, such as those of *F. cunicularia* and *F. fusca*. Of the foreign species, *F. saccharivora* makes its nest at the foot of sugar canes, so loosening the soil that they are blown down by gales. *F. indefessa*, an Indian species, is a great devourer of sweets. See ANT.

FORMIC ACID, $HCHO_2$, or H:CO:OH, a monobasic fatty acid, which derives its name from the circumstance that it was first obtained by distilling ants. It occurs in the animal and vegetable kingdoms, especially in the red ant, *Formica rufa*. When an ant walks over moistened blue litmus it turns it red. It exists also in certain caterpillars, in several secretions of the human body, as in blood, in urine, in the fish-juice, and in perspiration. It is also found in the juice of the stinging nettle, and in commercial oil of turpentine that has been exposed to the air, and in certain mineral springs.

FORMICIDÆ, in entomology, a genus of aculeate *Hymenoptera*, tribe or subtribe *Heterogyna*. The abortive females are wingless, the basal joint of the antennæ in the females and neuters is long and elbowed; the upper lip of the neuters, large, horny, and perpendicular, the first or second joint of the abdomen knotted. In many species the females and neuters have stings. They are generally social insects living in communities, consisting of males, females, and neuters. The chief genera are *Formica*, *Polyergus*, *Ponera*, *Myrmica*, and *Atta*. *Formica* and *Myrmica* have representatives widely distributed.

FORMOSA (Chinese Tai-Wan, or "Terrace Bay"), an island in the Chinese Sea, belonging to Japan; about 80 miles from the Chinese coast, from which it is separated by the Channel of Foh-kien (sometimes called Strait of Formosa),

and 170 miles N. of Luzon, the chief of the Philippine Islands; length, N. to S. about 250 miles; breadth, in its center, about 80 miles; area estimated at 13,300 square miles. A chain of mountains runs through the island in its entire length, forming, in general, the barrier between the Chinese on the W., and the independent natives of the unexplored country on the E. side. On many of its peaks snow remains during the most of the summer. It exhibits distinct evidence of former volcanic action, and sulphur, naphtha, and other volcanic products are abundant. Some parts of the coast present bold headlands; but all of the W. shore is flat, and surrounded with rocks and shoals. Its harbors, which were formerly good, have now become nearly useless, owing to the encroachments of the land upon the sea. Ke-lung, at its N. extremity, is the only good port. Soil, highly fertile and productive. All the large plain of the S. resembles a vast cultivated garden. The principal productions are rice, sugar, camphor, tobacco, wheat, maize, millet, truffles, vegetables, and the choicest of Asiatic and European fruits; pepper, aloes, green tea, cotton, hemp, and silk are also important articles of cultivation. The leopard, tiger, wolf, etc., are found in the more impenetrable tracts of the interior; the domestic breeds of animals, game, etc., are abundant. The chief mineral deposits are salt and sulphur. The trade is mostly in the hands of Chinese and British merchants, who also own all the shipping. The principal article of import is opium. The natives bear no resemblance to the Chinese; but they have an apparent alliance with the Malay or Polynesian race. The Japanese, Spanish, Portuguese, and Dutch have been successively masters of this island. The latter were in 1662 expelled by the Chinese, and the former reoccupied it after the Chinese-Japanese War, in 1895. Pop. about 3,700,000, including resident Japanese citizens and soldiers. Capital, Taiwan City. Pop. 54,000.

FORMULA, in chemistry, an expression by means of symbols, especially letters and numbers, of the chemical elements contained in a compound; in medicine, a prescription. In mathematics, a formula is the expression of a general rule or principle in algebraic symbols. For example, the equation—

$$(a + b)\ (a - b) = a^2 - b^2$$

is a formula, being the algebraic expression of the fact that the sum of two quantities multiplied by their difference is equal to the difference of their squares. If a rule or principle is translated into algebraic expressions, the result is a formula; conversely, if a formula is translated into ordinary language, the result is a rule or principle.

In Church history, a formula is a formal enunciation or declaration of faith or doctrine. The formula of concord was a confession of faith upon the points on which the Lutherans differed from the Calvinists, especially in connection with the Eucharist. The issue of such a document was suggested by Augustus, Elector of Saxony, who employed James Andreä to ascertain opinions on the subject, and draw it out. His chief assistants were Martin Chemnitz, Nicholas Selnecker, Andrew Musculus, Christopher Cörner, and David Chytæus. The formula was published in 1580, all clergymen and schoolmasters being required by the Elector to subscribe to it. It indorsed the opinions of Luther, and widened the breach with the Swiss and other reformed Churches.

The formula consensus was a formula drawn up in 1675, by John Henry Heidegger, a celebrated divine, of Zurich, at the instance of his clerical brethren, to preserve the Calvinistic doctrine from the slight modifications of it introduced by the French divine, Amyraut, and others. It was annexed by the magistrates to the common Helvetic formulas of religion. Its effect was found adverse rather than favorable to peace. It was abolished in the canton of Berne and the republic of Geneva in 1686, and ultimately became incapable of enforcement anywhere.

FORREST, EDWIN, an American actor; born in Philadelphia, Pa., March 9, 1806; made his first appearance on the professional stage in the title rôle of Douglas at the Walnut Street Theater, Philadelphia, in 1820. After a long tour in the West, during which he undertook several Shakespearean characters, he appeared as Othello at the Park Theater, New York, in 1826, where he met with remarkable success. In 1835 he went to England, and was there warmly received. Subsequently he played in Europe and the United States, but in 1871 retired from the stage. He died in Philadelphia, Pa., Dec. 12, 1872.

FORT, in the general sense of the word, a small, inclosed work, usually erected near an important fortress or fortified town, to command any of the approaches to it. Forts are also frequently erected on the sea coast, for the defense of certain positions. They are generally quadrilateral, with bastions or demibastions at the angles, but it depends mainly on the position they occupy, whether they are triangular,

square, polygonal, or in the form of a crown-work or star. They consist for the most part of a rampart, surrounded with a ditch and glacis; but in some cases an outwork is constructed for the defense of any side on which it may be more easily assailed. Paris is completely girdled with a chain of carefully planned forts, mostly pentagonal, in the shape of an enceinte, and situated at distances varying from a mile to 2½ miles from the inner line of bastions that encircle the city. In North America, generally, the name was also applied to a trading post in the wilderness with reference to the indispensable defenses, however slight, against the surrounding savages.

FORT COLLINS, a city of Colorado, the county-seat of Larimer co. It is on the Cache la Poudre river, and on the Union Pacific and the Colorado and Southern railroads. It is the center of an important agricultural region and has manufactures of beet sugar, flour, bricks, etc. It is the seat of a Lutheran theological seminary and of the State agricultural college. It has a public library, a court house, hospital, and several excellent parks. Pop. (1910) 8,210; (1920) 8,755.

FORT DODGE, a city of Iowa, the county-seat of Webster co. It is on the Minneapolis and St. Louis, the Illinois Central, the Fort Dodge, Des Moines and Southern, and the Chicago Great Western railroads, and on the Des Moines river. It is an important manufacturing center and has manufactures of clay products, brick and tile, oatmeal, shoes, etc. It is also an extensive coal region and in the neighborhood are large deposits of sand, clay, and sandstone. It is the seat of Tobin College and St. Joseph's Mercy Hospital. There is also a court house and a public library. It has the repair shops of four railroads which enter the city. Pop. (1910) 15,543; (1920) 19,347.

FORTH, a river of Scotland, rising on the E. side of Ben Lomond, in Stirlingshire. After a sinuous course E. past Aberfoyle, Stirling, and Alloa, it unites with an arm of the sea called the Firth of Forth. Its chief affluents are the Teith, Allan, and Devon. The Firth at its mouth is 35 or 40 miles wide, from Fife Ness on the N., to St. Abb's Head on the S. shore, both washed by the German Ocean. It contains several islands, of which the chief are Inchgarvie, Inchcolm, Inchkeith, the Bass, and the Isle of May; the largest of these is but a few miles in circuit. Lighthouses are erected on Inchkeith and on the Isle of May. The Forth possesses many good harbors, and St. Margaret's Hope, above Queen's Ferry, is one of the safest roadsteads in the island. Length of river, including its "links," 180 miles.

FORTH BRIDGE, a remarkable work in engineering, spanning the Firth of Forth in Scotland; completed and formally opened on March 4, 1890. The construction was begun early in 1883, and the total cost up to the time of completion may be given in round numbers as $16,000,000. Total length, upward of 1½ miles; cantilever arms projection (outer), 680 feet; depth of cantilevers over piers, 342 feet; depth at ends, 41 feet; distance apart of lower members at piers, 120 feet; struts, largest diameter, 8 feet; ties, greatest length, 327 feet; central girder, span, 350 feet; central girder, depth at center, 51 feet; central girder, depth at ends, 41 feet; total amount of steel in bridge, over 50,000 tons, height of cantilever pier (masonry) above water, 209 feet. The designers of the bridge were Sir John Fowler and Benjamin Baker.

FORTIFICATION, the art of increasing, by engineering devices, the fighting power of troops who occupy a position. The relation of fortification to the other great divisions of the art of warfare, strategy and tactics, may be divided as follows: Strategy determines the location of the position, which must conform to the general plan of campaign; tactics determines the best disposition of the troops on the position, for offense or defense; fortification improves the natural features of the position so as to increase the chances of success. Fortifications are commonly divided into two classes: "permanent fortifications" and "field-works." Under the former are included all works that are constructed for the defense of town, harbor, arsenal, dockyard, etc., being carefully laid out and built with a view to durability and the resistance of an attack, whenever it may be made; under the latter, all works are classed that are intended to serve a temporary purpose, such as siege-work and batteries for an attack on a fortress, or lines of intrenchment hastily thrown up for the protection of an army in the field, or to check the advance of an enemy on an important strategical position. These works differ mainly in the manner in which they are built, the ramparts and parapets of permanent works being faced or riveted with blocks of granite; the terre-plein of the rampart on which the guns are worked, the cheeks of the embrasures, casemates, bomb-proof buildings for magazines, etc., being formed of the same material; while field-works consist of mounds of earth formed of that which is thrown

up out of the ditch in front, having the ramparts and embrasures riveted with sods of turf, fascines, gabions, and sandbags, the terre-plein for the support of the guns and their carriages being made of pieces of thick timber strongly bolted together.

The great improvements lately made in the construction of heavy guns have rendered it necessary to revise the systems of fortification formerly in vogue. Iron and steel turrets are taking the place of masonry on low sites which are much exposed and where earth cannot be employed advantageously. These turrets are revolving cupolas, with spherical roofs; while in some instances the guns are mounted on disappearing carriages. In the United States the frontiers exposed to attack being very largely maritime, the fortifications are principally batteries of heavy guns adapted to a contest with steel-plated ships. It was formerly usual to mount guns in masonry casements built tier over tier, but this method has been discarded in consequence of the modern developments in ships and guns. It was demonstrated during the World War when the Germans smashed the Belgian forts that earth and sand constitute the most effective defense. Stone, concrete and steel cannot withstand modern siege-guns.

Iron-clad Forts. Since 1859 the progress of fortification in Europe was in the direction of the use of some form of iron armor. In England the necessity for using iron in fortifications was apparent just as soon as this material began to be used in ships, and in 1861 England entered upon the work of rebuilding her forts with iron. It was substantially completed in 1878, at a cost of $37,000,000, expended on nine harbors. Within comparatively recent times have come the solid iron turrets, of enormous thickness, carrying two 80-ton guns each, which form part of the defenses of Dover, England. While many of these forts, which were built while the contest between guns and armor was still in progress, can be pierced by the more recent guns, yet the number of large guns which they mount is far superior to the number that could be brought against them afloat, and in connection with torpedoes and ironclad ships they afford a secure defense. On the Continent the problem was not taken up till guns had reached a greater development, and then it was solved generally in the direction of using iron alone, in the form of turrets or domes. Some were of wrought iron, some of steel, and some of cast iron. The latter were the Gruson cupolas, of which many were constructed in various harbors of Germany, Austria, Belgium, Holland, and Italy. See FORT.

FORT LEE, a borough of New Jersey, in Bergen co. It is connected by ferry with New York City. Several important moving picture studios are located here. It has the Institute of the Holy Angels. During the Revolutionary War one of the forts defending the Hudson was situated here. Pop. (1910) 4,474; (1920) 5,761.

FORT MADISON, a city of Iowa, the county-seat of Lee co. It is on the Missouri river, and on the Atchison, Topeka, and Santa Fe, and the Chicago, Burlington and Quincy railroads. Its industries include pork packing, railroad shops, grain elevators, cement works, flour and saw mills, farm-implement works, button works, etc. It is the seat of the State penitentiary and has a public library, two hospitals, and several parks. Pop. (1910) 8,900; (1920) 12,066.

FORTRESS, the development of modern ordnance has rendered fortification as exhibited in the construction of the fortresses of the past practically obsolete and useless. It is probable that no fortress in the world (with the exception, perhaps, of Gibraltar) would form a serious obstacle to a modern naval or land attack, if the assailants were provided with the most approved modern heavy guns. In view of this fact, the construction of fortresses has been directed almost entirely to enabling them to cause a ricochet of shots directed against them rather than to oppose the direct impact. Hence modern fortresses are usually small, and present nowhere a direct angle to the line of fire, being generally constructed on the turtle-back or spherical plan. They usually contain but few guns, and those of the heavier calibers, rendering them offensive, rather than great strongholds of defense, as formerly. Of this latter class the strongest fortress surviving in the United States is Fortress Monroe, on Hampton Roads in Virginia, erected for the defense of Norfolk navy yard and the Virginian coast at that point. It was planned and built by a French engineer, and was an important Federal stronghold during the Civil War. Other important historical fortresses are McHenry, Moultrie, Pickens, Webster, St. Augustine, and Sumter.

The greatest fortress in the world, from a strategical point of view, is the stronghold of Gibraltar, on the coast of Spain. It occupies a rocky peninsula jutting out into the sea, about one and a half miles in length and three-quarters of a mile in width. One central rock rises to a

height of 1,435 feet above the sea level. Its N. face is almost perpendicular, while its E. side is full of tremendous precipices. On the S. it terminates in what is called Europa Point. The W. side is less steep than the E., and between its base and the sea is the narrow, almost level, span on which the town of Gibraltar is built. The fortress is considered impregnable to military assault. The regular garrison in time of peace numbers about 7,000. It belongs to England.

FORT SCOTT, a city of Kansas, the county-seat of Bourbon county. It is on the St. Louis and San Francisco, the Missouri, Kansas and Texas, and the Missouri Pacific railroads. It is also on the Marmaton river. It is the center of important deposits of coal, cement, clay, zinc, and lead. The industries include foundry and machine shops, flour mills, cement works, and manufactures of harness, medicines, etc. Pop. (1910) 10,463; (1920) 10,693.

FORT SMITH, a city of Arkansas, one of the county-seats of Sebastian co. It is at the junction of the Arkansas and Poteau rivers, and is on the St. Louis and San Francisco, the Arkansas Central, the Midland Valley, the Kansas City Southern, the Fort Smith and Western, and the St. Louis, Iron Mountain and Southern railroads. It is an important wholesale jobbing center for the surrounding country, and has a large trade in coal, cotton, lumber, etc. Its industries include saw and planing mills, iron and steel mills, and manufactures of brooms, stoves, overalls, refrigerators, etc. The river is spanned within the city limits by four steel bridges. It has a United States court house and post office, a high school, a public library, a city park, several hospitals, and a national cemetery. Pop. (1910) 23,975; (1920) 28,870.

FORTUNA, in mythology, daughter of Oceanus according to Homer, or one of the Parcæ according to Pindar, was the goddess of fortune, and from her hand were derived riches and poverty, pleasures and pains, blessings and misfortunes. She was worshipped in different parts of Greece. Bupalus was the first who modeled a statue of Fortuna for the people of Smyrna, and he represented her with the polar star upon her head, and the horn of plenty in her hand. The Romans held her in high esteem, and had no less than eight different temples erected to her honor in their city. She is generally represented blindfolded, and holding a wheel in her hand, as an emblem of her inconstancy. Sometimes she appears with wings.

FORT WAYNE, a city and county-seat of Allen co., Ind.; at the confluence of the St. Mary and St. Joseph rivers, and on the Wabash, the Lake Shore and Michigan Southern, the Lake Erie and Western, the Grand Rapids and Indiana, the Fort Wayne, Cincinnati and Louisville, and other railroads; 43 miles S. W. of Defiance, O. It is built on a high plateau, covers an area of about 10 square miles, and is popularly known as Summit City. Here are a United States Government building, several county buildings, Concordia College (Luth.), and several other educational institutions, Hope and St. Joseph Hospitals. Fort Wayne has street railroads, electric lights, sewerage system, improved waterworks, several National banks, and numerous daily, weekly, and monthly periodicals. Among the industries are extensive railroad, machine and repair shops which occupy many acres, flour mills, knitting mills, oil-tank works, and packing houses. The French visited this locality about 1700, and shortly afterward a trading post named Fort Miami was founded. The English constructed a fort near the place in 1760. General Wayne located a government post here in 1794. Pop. (1910) 63,933; (1920) 86,549.

FORT WILLIAM, a city of Canada, in the Thunder Bay District, in the Province of Ontario. It is on the Kaministiquia river, at its entrance into Lake Superior. The city has excellent harbor facilities and carries on a large lake traffic. It is the head of lake navigation on Lake Superior and is the entrance of the wheat fields of western Canada. It has repair shops of the Canadian Pacific, Grand Trunk Pacific, and Canadian Northern railroads. Its industries include flour mills, stove works, machine-shop, and car-wheel foundries, shipbuilding, brickyards, breweries, etc. The city has a large number of grain elevators. There is a number of fine public buildings including a city hall, a court house, hospitals, parks, a library, and a collegiate institute. Pop. (1920) about 20,000.

FORT WORTH, a city of Texas, the county-seat of Tarrant co. It is on the Texas and Pacific, the International and Great Northern, the Chicago, Rock Island and Gulf, the Gulf, Colorado and Santa Fe, the Fort Worth and Denver City, the St. Louis and San Francisco, and other railroads. It is also on Trinity river. Fort Worth is the center of a large stock-raising and agricultural district and has a large jobbing trade in general commodities,

and in hogs, sheep and cattle, grain, fruit, and produce. It has large stock yards with a daily capacity of over 30,000 head of cattle, and large packing houses. It has several important industries, including flour and stock-feed mills, rolling mills, railroad repair shops, foundries, cotton and oil mills, clothing factories, chemical works, etc. There has been built, at a cost of nearly $1,500,000 a large storage dam on the west fork of the Trinity river, 7 miles from the city, with a storage capacity of 30 billion gallons of water. Fort Worth is the seat of the Fort Worth University, the Texas Christian University, and the Southwestern Baptist Theological Seminary, and has a Masonic Orphans' Home and School, several academies, a number of denominational schools, and technical, art, and music schools. There are a public library and the Medical Library. The city is supplied with an excellent system of roads and has over 30 parks or park places; about 100 churches; and 10 hospitals. There were in 1920 5 National banks. Fort Worth was founded as a military post in 1849, becoming the county-seat in 1860, and was incorporated in 1873. Pop. (1910) 73,312; (1920) 106,482.

FORTY IMMORTALS, THE, the members of the French Academy. See ACADEMY, FRENCH.

FORUM, an open space in Roman cities, generally surrounded by a covered colonnade, that fronted an ambulatory, and buildings of various kinds, such as temples, courts of law, prisons, granaries, etc. In the later period of the empire, when Rome had attained the summit of its glory, there were 19 fora within its limits, which were divided into two classes, some being especially set apart for public meetings and the proceedings of the law courts, while others were devoted to business purposes and the requirements of trade. The Forum Romanum, the first that was erected in Rome, served equally for the purposes of trade and all public meetings, as well as for the administration of justice by the consuls, decemvirs, and other magistrates of Rome. This forum was subsequently distinguished for its magnificence; the shops were removed, and many temples of the heathen gods, the senate-house, and the comitium, were erected in its immediate vicinity, and in communication with it. It was also adorned with arches, statues, and pulpits, from which public meetings were addressed, and which were called rostra, from being surrounded with the brazen beaks (rostra), or ornaments of the prows of the ships of war that had been captured by the Roman triremes. Exhibitions of gladiators were often shown in the forum. The Roman forum corresponded to the agora of the Greeks, and no Roman city or colony was without this important center for the transaction of business and public affairs. Plans of the forum at Pompeii and the principal forum of Rome are given in "Pompeii," a work published by the Society for the Diffusion of Useful Knowledge. See ROME.

FOSCARI, FRANCESCO, a doge of Venice; born in 1372, in 1416 was named procurator of St. Mark's and in 1423 was elected doge. His son, Giacopo, being accused of ordering the assassination of a senator Donati, the enemies of the family created such commotion in the state, that he was banished from the city, the father having to ratify the sentence. Love of his country, and devotion of his wife, compelled the banished Foscari to revisit Venice, where he was again made prisoner, put to the question of the rack, and a second time banished, dying soon after of his wounds. The bereaved father went mad, in which state the enemies of his family compelled him to abdicate. He died three days after a spasm, upon hearing the bells of St. Mark's announce to Venice the election of a new ruler. Byron wrote on the subject a tragedy entitled "The Two Foscari." He died in Venice, Nov. 1, 1457.

FOSCOLO, UGO (fos'kō-lō), an Italian poet and patriot; born on the island of Zante, Jan. 26, 1778. His tragedy "Thyeste" was received with great favor at Venice in 1797. "The True Story of Two Luckless Lovers, or Last Letters of Jacopo Ortis" (1799), afterward rewritten and renamed "Italy" (1802), voices his disappointment that the French armies did not liberate Italy; as did an outspoken apostrophe to Bonaparte. In 1807 was published his finest poem, "The Graves." His second tragedy, "Ajax," brought out at Milan in 1809, caused his expulsion from Lombardy; he went to Florence and there produced the tragedy "Ricciarda" (1813); compelled to flee from Italy, he composed in Switzerland the bitter satire against his enemies, "The One-Volume Book of the Super-Revelations of the Cleric Didumus, Least of the Prophets." He wrote many critical and literary essays. He died in London, in 1827.

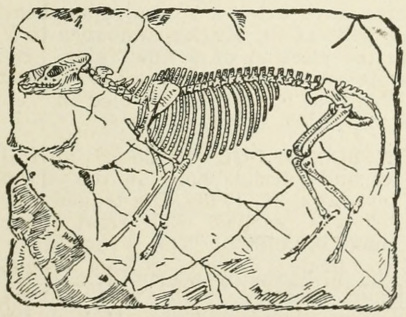
FOSSA, in zoölogy, a term applied to certain depressions on the external surface, generally the seat of cutaneous glands, as the lachrymal fossæ in deer and antelopes.

In anatomy (1) In the singular, a groove. There are in the ear a fossa of the helix, which is a groove called also fossa innominata or scaphoidea, and a fossa of the antihelix, which is a somewhat triangular depression, called also fossa triangularis or ovalis. There are also a fossa of the heart, one of the gall bladder, etc. There are also a canine, a corodoid, a digastric, a digital and many other fossa. (2) In the plural, grooves. There are nasal fossæ, superior and inferior occipital, etc.

FOSSIL, originally, "all bodies whatever that are dug out of the earth are by naturalists commonly called by the general name of fossils."

At present, any body, or the traces of the existence of any body, whether animal or vegetable, which has been buried in the earth by natural causes; one of the bodies called organic remains. Even the cast of a fossil shell, that is the impression which it has left on the rock, is deemed a fossil. (Used often in the plural.)

In the early part of the 16th century fossils were supposed by some Italians to have been formed in the hills by the



FOSSIL—SKELETON OF HYRACOTHERIUM VENTICOLUM, FROM EOCENE STRATA

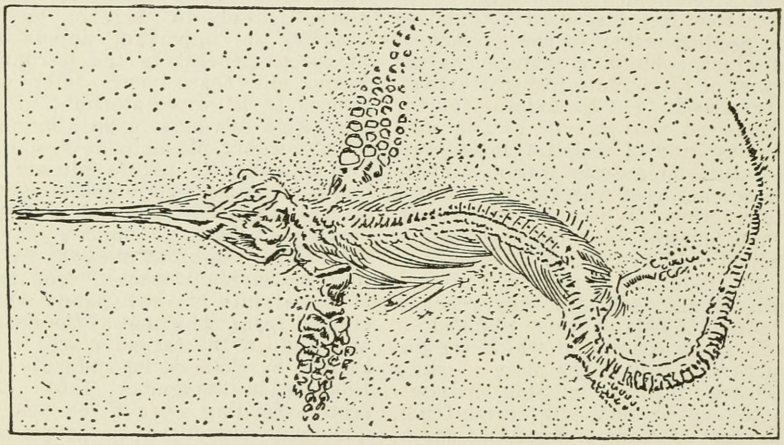
action of the stars, a view which, prior to 1579, Leonardo da Vinci combatted. Then the hypothesis arose of a plastic force, or, according to Andrea Mattioli, a fatty matter capable of fashioning stones into organic forms. But the hypothesis which held its place longer than any other, and is not yet extinct among the unscientific, is that they were relics of the Mosaic deluge. It is now thoroughly proved that the relics are really those plants and animals, that they were nearly all of them in existence ages before the Mosaic deluge, that they are not nearly contemporaneous with each other, but differ in age by untold millions of years, that there is at least a progression among them, if not even the evolution of the last from the more antique. There are breaks or gaps in the series of fossiliferous strata, especially one between the Palæozoic and the Secondary strata, and another between the Secondary and the Tertiary. Mr. Darwin showed that it is almost exclusively strata desposited in seas or lakes which at the time were slowly sinking that have been preserved; those formed when land was rising have as a rule been washed away. In the older strata, and sometimes in those not so ancient, fossils have been destroyed by metamorphic action, and when any rock is called non-fossiliferous or azoic, the cautious geologist means by the term only that fossils have not been found in it up to the present time.

FOSSORES, or **FOSSORIA**, in entomology, burrowing *Hymenoptera*, a sub-tribe of the hymenopterous tribe *Aculeata*. Sexes two, the individuals in both of which are furnished with wings, legs formed for burrowing or for running, tongue not elongated, but widened at the extremity. Habits not social. The females of the fossores construct holes in the ground, where they form their nests. Depositing their eggs, they next lay up for the future larvæ a supply of food consisting of spiders and caterpillars rendered half dead by being stung. Many of the fossores are called sandwasps. The sub-tribe is divided into eight families: (1) *Scoliadæ*, (2) *Sapygidæ*, (3) *Pompilidæ*, (4) *Sphecidæ*, (5) *Bembicidæ*, (6) *Larridæ*, (7) *Nyssonidæ*, and (8) *Crabonidæ*.

FOSTER, JOHN WATSON, an American statesman and diplomat. He was born in Pike co., Ind., March 2, 1836. He graduated in 1855 from Indiana State University and for a time attended the Harvard Law School. When the Civil War broke out he enlisted as a major in the United States Volunteers, rising to the rank of Brigadier-General by the time the contest closed. After taking a prominent part in the councils of the Republican party he began his diplomatic career as minister to Mexico. After serving seven years at this post and one as minister to Russia he practiced international law at Washington and thus in 1883 became Minister to Spain. From 1885 to 1891 he negotiated for the United States a series of reciprocity treaties with Germany and Brazil. President Harrison in 1892 appointed him Secretary of State, a post he held until Cleveland was inaugurated the following year. The closing years of his life saw him engaged on many important diplomatic missions for the United States,

and for a few years he acted as adviser to the Emperor of China. He died Nov. 15, 1917. He wrote several important works, among them being: "A Century of American Diplomacy" (1900) and "American Diplomacy on the Orient" (1903).

FOSTER, STEPHEN COLLINS, an American song-writer; born in Pittsburgh, Pa., July 4, 1826; was educated at Athens Academy and Jefferson College, Pennsylvania. He composed the music and wrote the words of over 125 popular songs and melodies, among which are: "Olk Folks at Home"; "Nelly Bly"; "Old Dog Tray"; "Come Where My Love Lies Dreaming"; "Suwannee River," etc. He died in New York City, Jan. 13, 1864.



FOSSIL—SKELETON OF ICHTHYOSAURUS

FOSTORIA, a city of Ohio in Seneca and Hancock counties, and near the boundary line of Wood county. It is on the Baltimore and Ohio, the Lake Erie and Western, the Hocking Valley, the Lake Shore Electric, the New York, Chicago, and St. Louis, and the Toledo and Ohio Central railroads. It is an important industrial community and has lime kilns, manufactures of glass, automobiles, lumber, etc. In the neighborhood are extensive oil fields. The city was founded by the father of Charles Foster, Governor of Ohio and Secretary of the United States Treasury in 1891-1893. Pop. (1910) 9,597; (1920) 9,987.

FOTHERGILL, JESSIE, an English author; born in Manchester, England, June 7, 1856. Her stories show a keen faculty of observation; among them are: "Healey, a Romance" (1875); "The First Violin" (1878), in which German life is faithfully portrayed; "Probation" (1879); "Kith and Kin" (1881); "The Lass of Laverhouse" (1888); "Oriole's Daughter" (1893). She died in London, July 30, 1891.

FOUGÈRES, a town and capital of an arrondissement, in the department of Ille-et-Vilaine, France, situated on the Nançon river, 25 miles N. E. of Rennes. It is the center of a considerable industry in leather goods, boots and shoes, sail cloth, dairy products and timber, being surrounded by extensive forests. The population is about 14,000.

FOULKE, WILLIAM DUDLEY, an American writer and publicist, born in New York City in 1848. He graduated from Columbia University in 1869 and after studying law was admitted to the bar in 1870. In 1876 he removed to Indiana, becoming a member of the State Senate in 1883. From 1901 to 1903 he was a member of the United States Civil Service Commission, and was prominently identified with the work of the National Civil Service Reform League. From 1910 to 1915 he was president of the National Municipal League. He wrote "Slav or Saxon" (1887); "Dorothy Day" (a novel) (1911) "Lyrics of War and Peace" (1916); "Today and Yesterday" (poems) (1920). He was a frequent contributor to magazines on historical and other subjects.

FOULOIS, BENJAMIN DELAHAUF, an American soldier, born in Connecticut in 1879. He entered the army as a private and served until 1901 as a noncommissioned officer. In that year he was appointed 2d lieutenant of the 17th Infantry, and was promoted to be 1st lieutenant of the Signal Corps. In 1914 he

was appointed captain of the aviation section of the Signal Corps. He was promoted to be major in 1917 and in the same year was made temporary brigadier-general of the Signal Corps. He made a special study of aviation and was the senior military aviator in point of service. He commanded air service troops on the Mexican border and in 1917-1918 was chief of the air service of the A. E. F.

FOUNDATION, act of founding or fixing the base; the base of an edifice; original; rise; origin; that part of a building which rests on the ground; the base or groundwork of anything; establishment. A donation or legacy to support an institution; an established revenue, particularly for a charity; endowment; settlement; institution.

In architecture, the word foundation may be applied either to the surface or bed on which a building rests, or to the lower part of the building which rests on the natural bed. (1) Foundation as the bed. The best that can be had is solid rock, or any kind of resisting incompressible stratum, free from water. Where there is no chance of water, sand forms a solid foundation. When the soil is soft, loose, and shifting, a solid bearing can be obtained only by driving piles or long beams of wood sharpened at the end, through the soft soil, till they reach a hard bottom. This is then planked or laid with cross beams, on which the superstructure is built. The piers of many bridges are formed in this manner. Where the soil is soft, but not shifting, as in the case of made or deposited earth, the method of converting is adopted—*i. e.*, a large surface is laid with broken metal or gravel, and run together with hot lime, so as to form a broad, solid, artificial rock, on which the building may rest. (2) Foundation as the base of the building. The broader and larger the lower course of the mason work, the stronger the wall. The stones should, if possible, extend through and through, and project on each side of the wall. The Romans formed solid bearings of concrete as above described. In the dark ages, when there was want of knowledge combined with want of materials and means, many buildings fell from the yielding of the foundations. But knowledge came with experience, and the foundations of later buildings, during the 14th and 15th centuries, were built with extreme care, and on the virgin soil; the stones being as finely dressed as those above ground, were necessary to resist a strong thrust.

FOUNDING. Act of casting metals.

FOUQUÉ, BARON FRIEDRICH DE LA MOTTE, a German author; born in Brandenburg, Germany, Feb. 12, 1777. His first contributions to literature were: "Romances from the Vale of Roncesval" (1805); "Story of the Noble Knight Galmy and a Fair Duchess of Brittany" (1806); "Alwin" (1808); followed by the hero-drama "Sigurd the Snake-Killer" (1808); the epic poem,"Bertram du Guesclin" (1821); etc. In 1840 he published an autobiography. The work by which he is chiefly known to-day is "Undine" (1811); "Sintram" is also still familiar. He died in Berlin, Jan. 23, 1843.

FOUQUET, NICOLAS, a French statesman; born in Paris in 1615. He was Viscount of Melun and of Vaux, and Marquis of Belle Isle, finance minister under Louis XIV. of France. Attaching himself closely to Mazarin, he received in 1650 the important appointment of procureur-général to the parliament of Paris, and three years later was advanced to be superintendent of finance. His rapid advance made him ambitious of succeeding Mazarin as first minister, and in order to secure himself friends and a party he distributed money with a lavish hand; but he had a formidable rival in Colbert. Fouquet's plans were, however, brought to naught; for, in the first place, Louis himself took the reins of power into his own hands when they slipped from the grasp of the dead cardinal, and, in the second place, instigated thereto by Colbert, he suddenly arrested Fouquet in September, 1661. After a trial extending over three years, Fouquet was sentenced to perpetual exile and the loss of all his property, but the sentence was afterward altered to life-long imprisonment. He died in the fortress of Pignerol, March 23, 1680.

FOUQUIER-TINVILLE, ANTOINE QUENTIN, one of the most execrated figures of the French Revolution; born in Hérovel, France, in 1747. His early career was immoral, but insignificant. On the outbreak of the Revolution, he figured as one of the fiercest democrats. By Robespierre he was appointed, first, a member, then director and public accuser, of the revolutionary tribunal. Without education, or sense of justice, he executed the bloody orders of the Committee of Public Safety. Incapable of friendship, or of anything even remotely allied to generosity, he systematically abandoned his successive coadjutors in their hour of need, and sent to the scaffold, without the slightest compunction, Danton and Herbert, Robespierre and St. Just. He himself died by the guillotine, May 7, 1795.

FOURIERISM, a system partly of co-operation, partly of socialism; advocated, and to a certain extent carried out, by François Marie Charles Fourier.

Fourier's scheme was that what he called from the word phalanx, a phalanstery, consisting of about 400 families, or 1,800 persons, should live together, combining their labor, upon a district about a square league in extent. The buying and selling transactions requisite for the support of the community, were to be managed by a single person, which would save a multitude of peddling operations. If any brought capital into the concern, it was not confiscated, but he was allowed interest upon it. The labor being carried on in common, the profits were apportioned on the following system: First a minimum of mere subsistence money was assigned to every member of the society, including those incapable of labor. The remainder of the profits were then divided in proportions agreed on beforehand, to remunerate labor and talent, and pay interest on the capital received. The profits divided thus were then expended by the individual recipients as they pleased. An effort was made about 1852 to form an industrial colony on Fourier's plan, but the attempt was unsuccessful.

FOWL, in its general sense, this term is nearly synonymous with birds; but in a more restricted sense it means those domestic birds brought up in a farmyard for the table. Fowls originally came from Persia and India, and they are valuable to the breeder in many ways, yielding profit as they do in eggs, in broods, and in feathers. The principal kinds of this useful domestic creature are: (1) the game fowl, with erect and slender body and showy colors; valued also for the delicacy of the flesh and of the eggs. It is this breed which is used for cock fighting. (2) The Dorking fowl, so named from Dorking, in Surrey, where it has long been bred in great numbers for the London market—a breed characterized by an additional spur on each leg; often of a white color, with short legs; one of the most useful of all breeds, both for excellence of flesh and for abundance of eggs. (3) The Polish fowl, black, with a white tuft, a breed very extensively reared in France, Egypt, etc., little inclined to incubation, but valued for an almost uninterrupted laying of eggs. (4) The Spanish fowl, very similar to the Polish, but larger, and laying larger eggs, on account of which it is now much valued, and very common in Great Britain; black, with white cheeks and large red comb. (5) The Malay fowl, tall and handsome, and very pugnacious, but little esteemed. (6) The Hamburg fowl, of very beautiful plumage, and much valued for the quality both of flesh, and eggs, as also for extreme productiveness of eggs. (7) The Cochin China fowl, a large, tall, ungraceful variety, with small tail and wings. Is valuable chiefly on account of its fecundity, eggs being laid even during winter, and the hens incubating frequently. (8) The bantam fowl, a diminutive variety, rather curious than useful. Of most of these there are many sub-varieties and fancy breeds —gold-penciled, silver-penciled, etc. The guinea fowl, or pintado, is sometimes classed among the common order of fowls; they are very wild and restless in their nature, and, unlike the ordinary fowls, they give no notice to any one of their laying or sitting; they have consequently to be closely watched. The guinea fowl is very delicate eating, and is in season about Lent. See POULTRY.

FOWLER, ELLEN THORNEYCROFT, an English novelist, born in 1873. She published several volumes of verse and a volume of short stories. She first achieved fame by the publication of "Concerning Isabel Carnaby" (1898). This was followed by "A Double Thread" (1899); "Fuel of Fire" (1902); "Place and Power" (1903); and "Ten Degrees Backward" (1915).

FOX, in general, the genus *Vulpes*. The foxes differ from the dogs in having a long, bushy tail, and the pupil of the eye elliptical or nearly linear by day, but becoming circular or nearly so by night. This fits them to be nocturnal animals. The American or red fox is *Canix fulvus*. Many skins are annually exported from this country. *V. lagopus* is the Arctic fox. The Deccan fox is *V. bengalensis*, though Bengal and the Deccan are some distance apart. *V. vulgaris*, formerly and still by many called, after the example of Linnæus, *Canis vulpes*, is the common English species. Its cunning is proverbial. It is an inhabitant of nearly all Euope, as well as of western Asia and northern Africa. Other species are the black or silver gray, the cross-gray, and the cross-woods foxes.

Also *Callionymus lyra*, the gemmeous dragonet, a fish, so called from its yellow color.

In nautical language, a small strand of rope made by twisting several rope-yarns together. Used for seizings, mats, sennits, and gaskets. In mechanics, a wedge driven into the split end of a bolt to tighten it.

FOX, CHARLES JAMES, an English statesman; born in England, Jan.

24, 1749; was educated at Oxford; entered Parliament in 1768; and in 1770 came forward as a supporter of Lord North. After six years' active support of that administration he was dismissed from office in consequence of a quarrel with his chief. Thereupon he joined the opposition and became the most formidable opponent of the coercive measures adopted by England toward the American colonies. In 1782, on the downfall of Lord North, he was appointed one of the secretaries of state, which office he held till the death of Rockingham. On the dissolution of the Shelburne administration in 1783 the North and Fox coalition was formed, and he resumed his former office; but the rejection of the India Bill by the House of Lords led to his resignation. It was then that Pitt came into power and that the long and famous contest between him and Fox began. After the death of Pitt in January, 1806, Fox became Foreign Secretary in the Ministry of All the Talents, and was on the point of introducing a bill for the abolition of the slave-trade, when he died in Cheswick, England, Sept. 13, 1806.

FOX, GEORGE, founder of the Society of Friends; born in Drayton in Leicestershire, England, in July, 1624. His father was a weaver, and by the strict honesty of his conduct had won from his neighbors the sobriquet of "Righteous Christer." George, while yet a boy, was distinguished by his gravity and exemplary conduct. When in the 20th year of his age, and for some two or three years afterward, Fox describes himself as having been in a very distressed state of mind, from which the various professors and clergymen to whom he applied for counsel were unable to relieve him. From this condition he was at length delivered by that which he regarded as the voice of God in his soul, directing him to Christ as alone able "to speak to his condition." Very soon after this he commenced his public ministrations at Dukinfield, Manchester, and the neighborhood. From the first, his preaching seems to have made many converts and excited much opposition. Fox's first imprisonment took place in the year 1648, in consequence of his opposing the preacher in "the great steeple-house at Nottingham," on a point of doctrine. In 1650 he was imprisoned at Derby under a false charge of blasphemy. One of the committing justices, Bennet, acted with great violence on this occasion. Cromwell, though himself favorable to liberty of conscience, seems to have been unable to curb popular hostility launched against a sect which denounced all state interferences with religion and maintained that the gospel should be preached without fee or reward. About a month after the restoration of Charles II., Fox was committed to Lancaster Castle "on the charge of being a common disturber of the peace, and of endeavoring to make insurrection and embroil the whole kingdom in blood." After lying in jail some months, a habeas corpus was obtained, and the authorities showed their disbelief of these grave charges by allowing Fox himself, unbailed and unguarded, to convey to London the sheriff's return to the writ. The act empowering magistrates to tender the oaths of allegiance and supremacy to any person whom they thought fit to suspect, operated with great severity against the Friends; under its provisions Fox was committed to prison at Lancaster in the beginning of 1664, whence he was removed to Scarborough Castle, where he lay till the autumn of 1666. In 1669 Fox married Margaret Fell, the widow of one of the judges of the Welsh courts. The year 1670 witnessed the passing of the most stringent of the Conventicle Acts, forbidding under heavy penalties the assembling for religious worship, in any house, of more than four persons besides the family, except according to the usages of the Church of England. Fox exhorted his friends to firmness, and himself remained in London, to share with their sufferings. Soon after his recovery from a severe illness he sailed for Barbadoes, where he exerted himself greatly in the interests of religion and humanity. After a considerable time spent in Barbadoes, Jamaica, and the North American continent, he returned to England in 1673. Here further persecutions awaited him. He underwent 14 months' imprisonment, and was at length liberated by the Court of King's Bench on account of the errors in his indictment. In 1677, in company with Penn and Barclay, who had joined the Society about 10 years before, he paid a visit to Holland and some parts of Germany, where his services seem to have been well received. The last 15 years of his life were tranquil as regards personal molestation. Persecution of Quakers continued throughout the reign of Charles II.; and though James, by a stretch of the royal prerogative, ordered a general release of those imprisoned for conscience's sake, the legal toleration of dissent was reserved for the next reign. In the first year of William and Mary was passed the bill which nullified the Conventicle Acts, and allowed the Friends to make a solemn declaration in lieu of taking the oaths, and Fox had the grati-

fication of seeing the public worship of the Society legally recognized before his death. He died in London, Jan. 13, 1690. See FRIENDS, SOCIETY OF.

FOX, JOHN (WILLIAM), an American writer of dialect stories; born in 1863. He became a contributor to magazines, and published "The Cumberland Vendetta, and Other Stories" (1895); "Hell Fer Sartain, and Other Stories" (1897); "Crittenden" (1900); "Bluegrass" (1901); "A Knight of the Cumberland" (1906) "Heart of the Hills" (1913) "In Happy Valley" (1917) "Erskine Dale—Pioneer" (1920). He died in 1920.

FOXGLOVE, in botany, the genus *Digitalis*, and specially the species *D. purpurea*, the purple foxglove. It grows to the height of three or four feet, with very long spikes of numerous drooping flowers, which are generally purple, though occasionally white. *D. purpurea* yields a valuable cardiac tonic and diuretic. The Canary foxglove is *D. canariensis;* the downy false foxglove is an American name for *Gerardia flava;* and the ladies' foxglove is *Verbascum thapsus.* They succeed well in light, rich soil.

FOX HOUND, a hound kept and trained for hunting foxes. They are smaller than the staghound, averaging 22 to 24 inches in height. They vary very much in color. They possess a very fine scent, great fleetness and endurance.

FRACKVILLE, a borough of Pennsylvania, in Schuylkill co. It is on the Pennsylvania and the Philadelphia and Reading railroads. There are important coal mines in the neighborhood and coal mining is the chief industry. Pop. (1910) 3,118; (1920) 5,590.

FRACTION, a part of any magnitude, integer (whole number), or unit. For example, "two and a fraction" means two units and that part of a unit which can be distinguished, as one-half, two-fifths, and so on. In the fraction ⅓ in arithmetic, or $\frac{a}{b}$ in algebra, the figure 1, or a, is the numerator, and 3, or b, is the denominator; and they represent that, if a whole number is divided into three or b parts, only one or a parts are taken. In the addition of fractions, the fractions must be brought down to the same denominator, and their numerators (as expressed in the value of their new denominator) must then be added, when we have one whole fraction. Thus, if we want to add ⅓ and 2-5, we must find the least common multiple of 3 and 5, which is found to be 15; then, as 3 goes 5 times into 15, and 5 goes 3 times into the same number, we multiply the numerators of the different fractions by those respective quotients, and then add the two quantities together. Thus, ⅓ added to 2-5 will be 5 added to 6 fifteenths. The true definition of a fraction may be thus summed up: It is the division of its numerator by its denominator; as seven-eighths are equivalent to the whole number 7 divided by 8—whence a fraction is obtained. Decimal fractions simplify calculations greatly, as they are constructed on the principle of having one common denominator—a multiple of 10; and thus fractions can be added, subtracted, and divided without repeating over the tedious process of bringing down to a common denominator. See ARITHMETIC; DECIMAL FRACTION.

FRACTURE, in mineralogy, the irregular surface produced by breaking a mineral across, as distinguished from splitting it along the planes of cleavage. The chief kinds of fracture enumerated by William Phillips and others are conchoidal, even, uneven, splintery, and hackly.

In surgery, a solution of continuity in a bone. It is said to be simple when the bone only is divided, and compound when there is also a wound of the integuments communicating with the bone, which in such cases generally protrudes. In a comminuted fracture, the bone is broken into several pieces, and in a complicated fracture there is in addition to the injury done to the bone a lesion of some considerable vessel, nervous trunk, etc. Fractures are also termed transverse, oblique, etc., according to their direction.

FRA DIAVOLO ("The Devil's Brother"), a Neapolitan robber, whose real name was MICHAEL PEZZA; born in Calabria, 1760. He began life as a stocking-maker, after which he became a friar, and in this capacity was the leader of a gang of banditti in Calabria. In 1799 he assisted Cardinal Ruffo, who headed the counter-revolutionists in favor of the Bourbons of Naples. For this he received a pardon of his crimes, and a pension of 3,600 ducats, with which he was enabled to purchase an estate. He lived in peace till 1806, when he rose again in favor of the expelled Bourbons. He entered Spalinga, and threw open the prisons, when he was joined by large numbers of lazzaroni; but after a severe engagement with the Bonapartists, he was taken prisoner, condemned, and summarily executed in the same year. Auber, the French musical composer, has written one of his best operas founded on the adventures of this bandit.


FRANCE
NORTHERN PART
PARIS
AND SUBURBS
NORTH SEA
ENGLISH CHANNEL
BAY OF BISCAY
Important towns are shown in heavy Face type
Railways shown thus
Canals
SCALE OF STATUTE MILES
SCALE OF KILOMETERS
Copyright, L. L. Foster, Bay Co. 1895

FRA GIOVANNI ANGELICO DA FIESOLE. See ANGELICO, FRA.

FRAGONARD, JEAN HONORÉ, a French painter; born in Grasse in October, 1732. He studied under Chardin and Boucher; and, entering the academy schools, gained the prix de Rome in 1752. In Italy—which, later, he revisited—he was influenced mainly by the works of Tiepolo, the last of the great Venetians; and he executed many illustrations for Saint-Non's "Journey to Naples and Sicily." Returning to France, he in 1765 received 2,400 francs from Louis XV. for his "Callirrhoé," commissioned for reproduction in Gobelin tapestry; then he ceased to be academic, and began to be personal, to follow his true bent—helped to be most himself by the art of Venice and by the art of Rubens. He is well represented in the Louvre, most typically in its La Caze collection by such works as "Bacchante Endormie" and "La Chemise Enlevée." He died in Paris, Aug. 22, 1806.

FRAME, in engineering, the strong framework, outside the wheel, which supports the boiler and machinery on the axes of a locomotive engine.

FRAMINGHAM, a town in Middlesex co., Mass.; on the Sudbury river, and on the New York, New Haven, and Hartford, and the Boston and Albany railroads; about 20 miles W. of Boston. It comprises the villages of Framingham, South Framingham, and Saxonville. Here are a high school, a State Normal School, Historical and Natural History Societies, the State Woman's Reformatory, several National and savings banks, daily and weekly newspapers, and street railroad and electric light plants. It has a large industry in woolen goods. Pop. (1910) 12,948; (1920) 17,033.

FRAMPTON, SIR GEORGE JAMES. a British sculptor. He studied under W. S. Frith and entered the Royal Academy schools in 1881. In 1887 he won Gold Medal and Travelling Studentship and since then has won many medals and other honors in several countries. Has executed many memorials and statues, including that of Queen Victoria for Calcutta, Southport, St. Helens, Newcastle-on-Tyne, Winnipeg, and Leeds. Among his other works are the terra-cotta decoration on the Constitutional Club, London; the sculpture on the Glasgow Art Galleries and Lloyd's Register, London; the entrance to Electra House, Moorgate Street, London; spandrels at the entrance of the Victoria and Albert Museum; figures on the spires of St. Mary's, Oxford; saints on the shrine of William of Wykeham, Winchester Cathedral; lions at the British Museum; statues of Queen Mary at Calcutta and Delhi; Edith Cavell Memorial, London. Has also designed many medals, including the British Coronation medal.

FRANCE, a republic of S. W. Europe; bounded on the N. and N. E. by the North Sea, Strait of Dover, English Channel, and Belgium; E. and S. E. by the Alps, separating it from Italy, Switzerland, German Empire, and the Mediterranean; S. by the Mediterranean and the Pyrenees, that separate it from Spain; and W. by the Atlantic Ocean. By the terms of the Peace Treaty with Germany signed on June 28, 1919, Alsace-Lorraine was transferred to France, to date from the armistice of November 11, 1918. The districts of Lower Alsace, Upper Alsace and Lorraine became the Departments of Bas-Rhin, Alsace; Haut-Rhin; and Moselle. The total area added to France was 5,605 square miles, with a population in addition of 1,874,014, making the total area 212,659 square miles and the population 41,475,523.

Topography.—Generally, France may be said to lie in a gently descending slope between the mountains and the sea. The principal mountains are the Alps, designated in their various parts as the Maritime Alps, between France and Italy; the Cottian Alps, bounding the province of Savoy; the Graian Alps, between France and Switzerland, and the Pennine Alps, reaching to St. Gotthard. Branch ranges of the Alps in the interior make the whole country more or less mountainous. Of these spurs the Alps of Valais, Savoy, Dauphiné, and Faucigny, and the Great Chartreuse group, are the most important. Next in importance to the Alps are the Pyrenees, across nearly the entire Spanish boundary, and then N. nearly 300 miles. This range, called the Cévennes Mountains, is continued by the Côte d'Or. The Faucilles connect the Côte d'Or with the Vosges range on the Swiss frontier. In the interior are the mountains of Limousin, and the Aubrac system. Some of the highest peaks are famous, Mt. Blanc, 15,776 feet; Mt. Cenis, noted for the great tunnel that pierces it; St. Gotthard and Mt. Viso, 12,585 feet, of the Alps; and Pique d'Etats, 10,302 feet; Pic d'Carlitte, 10,203 feet; Néthou, 11,168 feet; and Mount Perdu, 10,995 feet, of the Pyrenees. The Seine, Loire, Garonne, Rhine, Meuse, Rhone, and Scheldt are the principal rivers of the country. Some of the chief affluents are the Maine and Allier, flowing into the Loire; the Dordogne, that joins the Garonne to form the Gironde; the Sambre, flowing into

the Meuse; the Moselle, flowing into the Rhine; and the Saône, flowing into the Rhone. France has over 1,500 miles of sea-coast, of which 395 is Mediterranean, 584 Atlantic, and 572 washed by the North Sea, English Channel, and Dover Straits. The principal ports are Havre, at the mouth of the Seine; Brest on the W. extremity of Brittany; Nantes, on the Loire estuary; Bordeaux, on the Garonne, having the Gironde estuary for a harbor; and Toulon on the Mediterranean. The Atlantic coast is mostly bold and rocky. The principal outlying islands are the Channel Islands in Bay St. Michael. The island of Corsica, in the Mediterranean, belongs to France.

Agriculture.—France is essentially an agricultural country of great richness and fertility. There were in 1912 nearly 100,000,000 acres available for cultivation, and of this about 60,000,000 acres were under crops. The war area included some of the richest agricultural land in the country and this, for more than four years, was practically untouched, and after the conclusion of the war remained in such condition that it will be probably useless for cultivation for many years. The arable ground torn up by shell fire and troops was about 9,925,000 acres. The fact that practically all the men available were engaged in the armies or in military services, threw the burden of agricultural cultivation on the women, girls, and boys. In spite of this fact the production of agricultural products continued to an amazing extent. The decrease in production, however, is shown by comparative figures. There were planted to wheat in 1914 6,060,000 hectares (a hectare is equal to 2.47 acres); in 1919 4,579,000 hectares, and in 1920 4,896,000 hectares. There were planted in rye in 1914 1,050,000 hectares; in 1919 827,000; and in 1920 906,000. In 1914 there were planted to oats 3,590,000 hectares; in 1919 2,758,000; and in 1920 3,014,000. France is a great wine producing country. The production of wine in 1919 was as great as that in the pre-war period, amounting to 1,132,161,000 gallons. The Germans removed from France a great number of cattle and horses. The cattle taken by them numbered 523,000 head; the horses and mules, 367,000; and the sheep and goats, 465,000 head. According to the terms of the Peace Treaty these animals were to be replaced. In 1920 74,000 head of cattle, 4,400 horses and mules, and 43,000 sheep and goats were replaced.

Mineral Production. — Prior to the World War there were 41,638 mines and quarries, employing 372,517 workers. The annual yield of the mines was valued at 829,458,262 francs and of the quarries 305,955,651 francs. During the war the coal area was directly in the line of military operations and the coal mines were not worked during that time. The systematic destruction of the coal mines was carried on by the Germans. The production of coal before the war was 42,000,000 tons. The production in 1920 was about 2,000,000 tons a month. By the terms of the Peace Treaty Germany is to deliver to France a specified amount of coal a month, and France has practical possession of the Sarre Basin. See SARRE BASIN.

The iron industry was of great importance during the war. There were in operation in 1914 72 blast furnaces, and in 1920 there were about 17 operated. The iron and steel industry in the invaded districts represented 85 per cent. of the total French production before the war. In 1920 this was being re-established to about 50 per cent., except the heavy steel works, of which about 14 per cent. had been restored. Of the rolling mills 3½ per cent. had been restored. The rolling mills were dismounted and machinery taken to Germany. According to the terms of the Peace Treaty this must be restored to France.

Commerce.—The commercial life of France was entirely disorganized as a result of the World War. In 1917 the imports were valued at 16,311,000,000 francs and the exports to 3,837,000,000 francs. During the first half of 1919 the imports exceeded the exports by 10,000,000,000 francs, while the imports during that period exceeded by 2,389,000,000 francs those during the same period in 1918. In spite of this enormous increase in value, the quantity had slightly diminished. This decrease was in material and manufactured products, while in food products there was an increase. As a result of the rise of prices the value of the exports, in spite of the falling off in quantity was nearly equal to that of 1913. The enormous rise of price was shown by the fact that the quantity had diminished by more than 500 per cent. The imports of food for the first eight months of 1919 amounted to 5,463,270,000 francs, and the total imports for the eight months of that year amounted to 18,475,706,000 francs. This was an increase of about 4,000,000,000 francs over the same period of 1918. The imports greatly exceeded the exports, and this continued throughout the year. The imports from Jan. 1 to Nov. 30, 1919, amounted to 25,336,978,000 francs, while the exports amounted to 6,223,448,000 francs, or a deficit of about 19,000,000,000 francs. This condition is explained

by the fact that nearly all French exports fall under the head of luxuries, for which it was difficult to find a market. The total imports for the first five months of 1920 amounted to 13,041,000,000, while the exports amounted to 5,970,000,000 francs. The chief articles of import are coal and coke, cast iron and steel, cereals, arms and munitions, chemical products and machinery. The chief articles of export are textiles, raw silk and yarn, leather, chemical products, and paper.

Transportation.—There were prior to the World War, about 25,000 miles of railway open for traffic. During the war the railroads were greatly disorganized and were used chiefly for war purposes. During the period of the war 1,400 miles of principal line were practically destroyed, while 1,480 miles of branch lines were destroyed. By 1920 the principal lines had been entirely repaired, while half of the branch lines had also been restored to use. In 1919 measures were passed providing for an increased efficiency in the operation of roads and a satisfactory organization of the great railroad systems. During 1919-1920 extraordinary efforts were made to restore normal conditions of operation of the railroads, especially of the battle area where they had suffered most severely. The great canal system also suffered greatly during the war. About 1,000 miles of canal were destroyed, of which 485 miles had been repaired by 1920. 32,000 miles of roads were also destroyed. Of this 10,000 miles were repaired in part and 1,122 miles completely restored in 1920.

Education.—The public schools constitute the University of France and are divided into primary, secondary, and superior. Before the war there existed 6,445 schools. Of these, 5,345 had been re-established in 1920. The total number of pupils of school age is 6,000,000. Of this about 3,000,000 are enrolled in the public schools. There are about 70,000 schools and 150,000 teachers. Secondary instruction is supplied by the lycées and by the communes in the colleges, and by associations and private individuals in free establishments. There are about 120 lycées, with about 60,000 pupils, and about 200 communal colleges with about 30,000 pupils. The higher education is supplied by the state and the universities and special schools. There are 16 universities in France. They are as follows: Aix-en-Provence, Besançon, Bordeaux, Caen, Clermont-Ferrand, Dijon, Grenoble, Lille, Lyon, Montpellier, Nancy, Paris, Poitiers, Rennes, Strasbourg and Toulouse. There were in the universities in 1917 about 15,000 pupils. Professional and technical instruction is provided in professional schools.

Religion.—There is no religion recognized by the state. Under the law of December 9, 1905, the churches were separated from the state, and the adherents of all creeds were authorized to form associations for public worship. All buildings actually used for public worship and as dwellings were made over to associations for public worship. There are in France 17 archbishops and 68 bishops of the Roman Catholic Church. The Associations law, passed July 1, 1901, requires religious communities to be authorized by the state and no monastic association can be authorized without a special law in each particular case. The prevailing religion is Roman Catholic.

War Destruction and Reconstruction.—The following figures are prepared by André Tardieu. The population driven from their homes by the war amounted to 2,728,000. Those returned in 1920 numbered 2,023,000. There were destroyed 4,068 municipal governments, of which 4,006 had been re-established in 1920. The dwelling houses damaged or wholly destroyed numbered 574,777. Of these, 13,100 had been rebuilt and 178,500 had been repaired in 1920. There had been constructed 46,570 temporary houses. The temporary houses and those rebuilt and repaired sheltered 887,000 people. The remainder of the returning population found quarter in the undamaged houses. Factories destroyed numbered 11,500. Those restored to work in 1920 numbered 3,540, and those in process of rebuilding in that year numbered 3,812. Reconstruction was undertaken on a large scale by the government and also by organizations established in the United States and other countries. In many cases towns and cities in the United States undertook the reconstruction of cities and towns in France. In spite of these efforts, however, the devastated area in 1921 had practically been untouched. The French depended in a large measure on the indemnity to be received from Germany for the reconstruction of this area. The delay in receiving any funds from the German Government made it necessary to adopt other measures.

The effect of the war on the population is indicated by the fact that the pre-war population was 37,790,000. There were mobilized 8,410,000 men out of a total subject to mobilization (19 to 50 years) of 9,420,000, or a mobilization of 89.5 per cent. of the available number. There were killed during the war 1,364,000 men or 16 per cent. of

those mobilized. The total wounded numbered 3,000,000. Of these 740,000 were incapacitated by the loss of an arm, leg, eye, or otherwise.

Finance.—The public debt on July 31, 1914, amounted to 27,264,937,331 francs. The consolidated public debt contracted in France from July 31, 1914, to June 30, 1920, amounted to 92,434,336,500 francs. The funded debt contracted from July 31, 1914, to June 30, 1920, amounted to 19,838,736,000 francs. The floating debt on June 30, 1920, amounted to 71,487,930,000 francs. There were advanced from banks sums amounting to 26,020,000,000 francs, making a total debt on July 30, 1920, of 247,045,937,831. The Bank of France had on hand gold amounting to 5,558,603,903 francs and of silver, 247,483,930 francs, or a total of 5,806,087,833. The total expenditure in 1919 was 48,793,884,587 francs. Of this 36,675,781,168 francs was for military and special expenditures. The budget for 1920 provided for expenditures amounting to 17,861,140,000 francs. The foreign debt included $2,785,300,000 advanced by the United States Government.

Army and Navy.— See ARMY and NAVY.

Colonies.—The colonies of France in Asia include French India, French Indo-China, Cochin-China, Annam, Cambodia, Tonking, and the territory of Kwang Chau Wan on the coast of China. In Africa are included Algeria, practically a government of Morocco; French Congo; Madagascar; Mayotte and the Comoro Islands; Réunion; French Somaliland; French West Africa and the Sahara, and Tunis. In America, they include Guadeloupe and dependencies, French Guiana; Martinique, and St. Pierre and Miquelon. In Australasia the colonies are New Caledonia and dependencies, and the French establishments in Oceania.

Government. — The government of France is that of a republic, the present republic dating from 1870. The executive and judiciary powers are vested in a President, chosen by the Senate and Chamber of Deputies, on joint ballot, and serving for seven years. The legislative body consists of a Senate, one-third of whose number is elected by the Senate itself, and the remainder by special bodies in each department, and in the colonies, and a Chamber of Deputies, the members of which are elected by popular suffrage, one from each arrondissement, and one additional for each 100,000 population or fraction of the same in the arrondissement, in excess of 100,000. The Cabinet of the President is composed of Ministers of Foreign Affairs, of Interior, Justice, War, Marine, Finance, Colonies, Works, Commerce, Agriculture, Labor, Liberated Territories, Hygiene, of Assistance and Social Prevision and of Pensions, Awards and War Grants. For administrative purposes France is divided into communes (local units), of which there are 37,946; cantons comprised of communes, 2,899; arrondissements, 362; departments, 90, and provinces, 37. The communes are governed locally by a mayor and municipal council (in the case of Paris, by a President and Vice-President). The cantons, usually comprising 12 communes, have no administrative officers; the arrondissement, usually consisting of 8 cantons, is governed by a sub-prefect. The departments, usually comprising 4 arrondissements, are each governed by a prefect, appointed by the President of the Republic. He superintends public order, commands the police, etc. Each department has a local legislative council, elected from the cantons.

History.—France was originally known to the Romans by the name of Transalpine Gaul; but after its conquest by Cæsar it was divided into the four provinces of Provincia Romanorum (Provence), Gallica Aquitanica, Celtica, and Belgica. In the 5th century it was subdivided into 17 provinces, inclusive of all the territory on the E. bank of the Rhine. At this time the Germanic nations began to overrun Gaul; the Visigoths established themselves from the Loire to the Pyrenees, where they established a kingdom that lasted till about 540. Burgundians settled in the E., from the Lake of Geneva to the Rhine, and afterward stretched along the Rhône to the Mediterranean. The independent sovereignty they erected lasted till about 532. The Franks, whose dominion swallowed up those of both the foregoing tribes, had long been settled in the N.; and Pharamond, their chief in 420, is considered the founder of the French monarchy, as he was of the first or Merovingian race of Frankish kings. In 486 Clovis defeated Syagrius, the Roman general, at Soissons, and in 507, by his victory over the Visigoths, he rendered himself master of all the country between the Loire and the Garonne. On the death of Clovis, in 511, his dominions were divided into four kingdoms—those of Paris, Metz, Soissons, and Orleans. These, however, were reunited in 558. In 732 Charles Martel defeated the Saracens in the S. of France, and expelled them from the kingdom. Under Pepin and Charlemagne the country was relatively peaceful and prosperous; but after the latter's death things returned to their original state of confusion. Under his immediate successor France was again divided into four parts, and


FRANCE
SOUTHERN PART
SCALE OF STATUTE MILES
SCALE OF KILOMETRES
Important towns are shown in heavy face type
Railways shown thus
Canals
CORSICA
SPAIN
GULF OF THE LION
MEDITERRANEAN SEA
BAY OF BISCAY
Long. from Greenw.
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the Normans began to ravage its N. provinces; the power of the nobility also rapidly increased and the last sovereign of the Carlovingian dynasty, Louis V. in 986-987, possessed only the town of Laon. His successor, Hugh Capet, Count of Paris and Orleans, the founder of the third race of kings, governed only the Ile-de-France, Picardy, and the Orleannais; the dukes of Normandy, Brittany, Aquitaine, Gascony, Lorraine, and Burgundy, the count of Flanders, Champagne, Vermandois, Toulouse, and several minor seigneurs, shared among them the rest of the modern kingdom. Vermandois was united to the crown by Philip Augustus; Toulouse and Perche, by Louis IX.; Champagne, in 1274; the Lyonnais, Dauphiny, and Languedoc, in the 14th century; Berri, Normandy, Gascony, Burgundy, Anjou, Maine, and Provence, in the 15th; Bourbonnais, Auvergne, Brittany, Lorraine, and considerable territories in the S. W. in the 16th; and Flanders, Artois, Franche-Comté, and Alsace in the 17th century. While the monarchy gained in consistency and extent, the regal power was making constant advances. At length, under the administration of Richelieu, the nobles were stripped of all power; and there being no other body in the State, with the exception of the parliaments—which had degenerated into little else than courts of law—that enjoyed any constitutional privileges, the power of the crown was raised above control. Under the vigorous, and for a lengthened period prosperous, government of Louis XIV., the royal prerogative arrived at a maximum. During the regency and the subsequent part of the reign of Louis XV., abuses of all sorts multiplied on all hands, and were no longer concealed by the dazzling splendor and magnificence of the preceding period.

Louis XVI., who ascended the throne in 1774, was actuated by the best intentions, but he wanted the firmness of purpose and capacity required in so desperate a crisis. At length, after a variety of futile expedients had been in vain resorted to, it was resolved, in 1789, to hold a meeting of the States-General, which had not been convened since 1614, for effecting the necessary changes and averting a public bankruptcy. This was the commencement of that tremendous revolution which cost Louis XVI. the crown and his life, and destroyed every vestige of the government and institutions that existed when it broke out. The atrocities connected with the Revolution were in wild, but not unnatural excesses of an uninstructed populace that had suddenly been emancipated from a state of extreme degradation.

The proscriptions and anarchy by which the Revolution was accompanied continued till Napoleon attained to the supreme direction of affairs. The talents of this extraordinary man were surpassed only by his ambition, which, by overstepping all bounds, precipitated him into enterprises that ultimately led to his overthrow. In 1814 the Bourbons were replaced on the throne; but in 1830 they were re-expelled from the kingdom. The crown was then offered, under conditions, to Louis Philippe, Duc d'Orleans, by whom it was accepted. He has the merit of having contributed, under very difficult circumstances, to the maintenance, for a lengthened period, of the peace of France and Europe. Under his reign the Revolution of Feb. 24, 1848, broke out, and resulted in the establishment of the republic, with a provisional government.

A new constitution having been voted by a "Constituent Assembly" of 900 members. Prince Louis Napoleon was elected head of the republic, for four years, by 5,562,843 votes, on Dec. 10, 1848. The prince President dissolved the National Assembly by a coup d'état, Dec. 2, 1851, and having remodeled the constitution, appealed to universal suffrage, which declared him president for 10 years, by 7,439,216 votes, on Dec. 21, 1851. By a third vote, Louis Napoleon was chosen Emperor of France, by 7,-864,216 against 31,145 votes, on Nov. 22, 1852, and assumed the title of Napoleon III., Emperor of the French, on Dec. 1, 1852. For the history of France since 1852, see NAPOLEON.

The government of Napoleon III. was in all essentials an absolute monarchy. The legislative powers and the suffrage were entirely within his control. In order to quiet the dissatisfaction of the people, Napoleon entered upon an aggressive foreign policy. He made an alliance with England and France against Russia in 1854, and the successful outcome of the Crimean War was a personal triumph for him. Paris became the diplomatic capital of Europe, following the Congress of Paris in 1856. Napoleon, in 1859, in the rôle of the champion of the oppressed nationalities, aided Italy against Austria and obtained as a reward possession of Savoy and Nice. His attempts at intervention in Poland in 1863 and in Schleswig-Holstein in the following year, were, however, unsuccessful. Far more disastrous, however, was his invasion of Mexico and the establishment there of an empire under Maximilian of Austria. The failure of this empire and the execution of

Maximilian were fatal blows at Napoleon's prestige. This was followed by the defeat of Austria in 1866 and the rise of Prussia, which threatened to deprive France of the leading position in European politics. While there was economic prosperity in France and great industrial development, there were many signs of dissatisfaction. Opposition to the Empire continued to grow until in 1869 Napoleon was obliged to grant a responsible ministry. It soon appeared, however, that this was in reality without power and that the personal government of the Emperor continued. An appeal to the people failed and the necessity of regaining his influence led Napoleon to enter once more upon an aggressive course of action in foreign affairs. This issue of the succession to the vacant Spanish throne precipitated the crisis between France and Prussia, whose foreign policy was now conducted by the genius of Bismarck. Napoleon, deceived by the false reports of his ministers in relation to the efficiency of the French army, permitted himself to be carried into the war with Prussia, which had been silently preparing for many years for such a conflict. The Franco-Prussian War was of short duration. The succession of defeats for the French ended on Sept. 2, 1870, in the surrender of Sedan. On Sept. 4, the Emperor and his descendants were declared forever excluded from the throne and France was proclaimed a republic. Following a period of disorder the first National Assembly met in February, 1871, at Bordeaux, and the Third Republic was formed. A treaty of peace was signed with Germany at Versailles on Feb. 26 and was quickly ratified by the French Government. France was obliged to cede Alsace and parts of Lorraine to Prussia, and pay an indemnity of 5,000,000,000 francs. Not until this indemnity was paid, in September, 1873, were the Prussian troops withdrawn from French territory. There were violent outbreaks of the commune in 1871, but these were suppressed. On Aug. 31 of that year, Thiers received from the National Assembly the title of President of the Republic. He resigned in 1873 and Marshal MacMahon was elected for a period of seven years. The National Assembly in 1873 adopted laws providing for the constitution of the National Legislature. MacMahon resigned in 1879 and was succeeded by Jules Grévy. In spite of attempts at the revival of the monarchy, republican sentiment continued to grow. The constitution was revised in 1884. France, in 1881, entered upon a foreign colonial policy by establishing a protectorate over Tunis. This was followed in 1883 by the enforcement of a claim of certain rights over Madagascar, which in 1896 became a French possession. In 1884 the war with China resulted in the establishment of a French protectorate over Annam and Tonking. M. Grévy was re-elected in 1885, but resigned in 1887. He was succeeded by Sadi Carnot, in whose administration occurred the Panama Canal scandal.

In 1889 there was a formidable attempt to overthrow the republic by a union of all parties favoring a monarchy. This was under the leadership of General Boulanger. After promises of success, the movement failed and the republic continued to grow in strength. President Carnot was assassinated in 1894 and was succeeded by Casimir-Perier, who in 1895 resigned and was succeeded by Félix Faure. In the latter's administration and that of his successor, Emile Loubet, occurred the famous Dreyfus case, which for a time threatened the downfall of the republic. The chief political tendency of this period was the increase of the Socialist power. Alexandre Millerand, the leader of the Socialists, at this time first emerged into power. In 1901 the Associations Law brought religious congregations under government supervision. The struggle between the Church and State continued throughout the following years, and ended in the complete separation of the Church and State in France, in 1905.

France had in 1891 formed an alliance with Russia, thus offsetting the importance of the Triple Alliance. This alliance was strengthened throughout the following years and cordial relations were established with Italy. These relations were chiefly due to Théophile Delcassé, who also accomplished in 1904 an agreement with England by which France abandoned certain rights in Newfoundland in return for territorial concessions in west Africa. France also recognized the predominance of Great Britain in Egypt in return for the right of France to maintain order in Morocco.

The defeat of Russia in the war with Japan left France without a strong ally, and Germany seized the opportunity to bring about the dismissal of Delcassé, whose policies were regarded by the German Government as hostile to it. The Algeciras Conference, which met in 1906, gave France certain customs rights on the Algerian frontier. Germany protested in 1908 and 1911 that the French sphere of influence was too extensive. In the latter year the German Emperor sent a warship to Agadir to protect German interests. France, however, was strongly supported by England, and Ger-

many was obliged to give way and to recognize rights of France in Morocco. In return of this recognition France ceded to Germany 112,000 square miles of the French Congo. In 1912 France secured a practical protectorate over Morocco.

The economic history of France is marked during this period by the rapid growth of industrial unionism and the development of the theory of direct action (See SYNDICALISM). General strikes occurred in 1909 and in 1910, but these were suppressed by the prompt action of Premier Briand who shattered the railroad strike by threatening military punishment.

Raymond Poincaré was elected President in 1913. Threatening conditions in Europe, especially in Germany, led to demands for an increase in the size of the army, and this was accomplished. During the closing months of 1913, disturbances in Alsace-Lorraine, particularly in Zabern, increased the growing hostility between France and Germany. Germany's policy of aggressiveness and militarism foreshadowed the outbreak of the World War. For an account of France's part in this great struggle, see WORLD WAR.

The progress of the war was marked by many important political events. The first of these was the assassination of M. Jaurés, the leader of the Unified Socialists, in 1914. The French Cabinet was reorganized on Aug. 26, 1914, with M. Viviani as Prime Minister. On Sept. 3, as a result of the possible danger of the German occupation of Paris, the French Government was removed to Bordeaux, where it remained until December of that year. Delcassé resigned as Foreign Minister on Oct. 30, 1914. On Dec. 2, 1915, General Joffre was placed in supreme command of all the French armies. Changes in the Cabinet were made during 1916 as a result of criticism in respect to the conduct of the war. There were, indeed, throughout the struggle, continuous changes in the ministry, which continued until the formation, in 1917, of a new ministry under Clemenceau. This continued throughout the duration of the war. A number of prominent persons were involved in charges of disloyalty and treason. These included Malvy, Minister of the Interior; Caillaux, a former Prime Minister; and Senator Humbert. There were also treason charges against the editors of the Bonnet Rouge, Bolo Pasha, and others. All these men were charged with being concerned either directly or indirectly in treasonable dealings with the enemy. They were all eventually tried and found guilty, with the exception of Senator Humbert, who was acquitted. France was represented at the Peace Conference chiefly by M. Clemenceau, who was one of the chief figures in the deliberations of that body on June 27, 1919. The Senate passed the Electoral Reform Bill which had already been passed by the Chamber. The Peace Treaty was ratified by the Chamber of Deputies on Oct. 9, 1919, and the military agreements between France, Great Britain, and the United States were also ratified on Oct. 13. On Oct. 19 the French War Parliament, which had been in session since the summer of 1919, came to an end. M. Clemenceau resigned as premier on Jan. 18, 1920. President Poincaré completed his term of office on Feb. 17, 1920, and was succeeded by Paul Deschanel. During May there were riots in Paris and a strike was begun for the nationalization of the railroads. These strikes were prevented by a threat of Premier Millerand to dissolve the General Federation of Labor. Deschanel resigned the presidency on Dec. 10 on account of ill health, and was succeeded by Alexandre Millerand. Georges Leygues became Prime Minister.

The chief efforts in France during 1920 and 1921 were for the reconstruction of the country from the devastations of the war. The financial and economic conditions are described in another portion of this article. France depended largely for rehabilitation upon the indemnities or reparations to be received from Germany. The Supreme Council finally decided that the total reparations should be about $56,000,000,000, to be paid in a definite period of years. At a session of the Supreme Council held in London in March, 1921, Germany refused to accept this sum and as a consequence French troops were despatched to occupy the German cities of Düsseldorf, Duisburg, and Ruhrort on March 7, 1921. See PEACE TREATY; ALSACE-LORRAINE; WORLD WAR; VERDUN, MARNE, PICARDY, AISNE, BATTLES OF; LEAGUE OF NATIONS; TREATY OF VERSAILLES.

The following are the Presidents of the Third Republic:

Louis Adolph Thiers, 1871-1873.
M. E. Patrice Maurice MacMahon, 1873-1879.
François Paul Jules Grévy, 1879-1887.
Marie François Sadi-Carnot, 1887-1894.
Jean Casimir-Perier, 1894-1895.
Félix Faure, 1895-1898.
Emile Loubet, 1898-1906.
Armand Falliéres, 1906-1913.
Raymond Poincaré, 1913-1920.
Paul Deschanel, 1920.
Alexandre Millerand, 1920-

FRANCE, ANATOLE (JACQUES ANATOLE THIBAULT), a French novelist and poet of great perfection and distinction of style; born in Paris, April 16, 1844. His first volume of "Poems" was published in 1873, and his dramatic poem "Corinthian Revels" in 1876. The humorous story "Jocaste and the Lean Cat" (1879) was received with indifference, but he had brilliant success with "The Crime of Sylvester Bonnard" (1881); "The Yule Log" (1881); and "The Wishes of Jean Servien" (1881). His other works include "Our Children: Scenes in Town and in the Fields" (1886); "Queen Pédauque's Cook-Shop"; "Opinions of the Abbé Jèrôme Coignard" (1893); "The Garden of Epicurus"; "Abeille"; "My Friend's Book"; "Our Children"; "Balthazar"; "Thaïs"; "Literary Life"; "Alfred de Vigny"; etc. He was elected to the French Academy in 1884.

FRANCE, ISLE OF. See MAURITIUS.

FRANCE, JOSEPH IRWIN, a United States senator from Maryland, born in 1873. He graduated from Hamilton College in 1895. He studied in Germany and at the Clark University. He graduated from the College of Physicians and Surgeons of Baltimore, in 1903, and engaged in the practice of his profession in Baltimore from 1905 to 1909. He was a member of the Maryland Senate and in 1916 was elected United States Senator for the term 1917-1923. He was a frequent contributor to magazines on scientific, economic, and political subjects.

FRANCESCO DI PAULA, or ST. FRANCIS OF PAOLA, an Italian monk, founder of the order of the Minims; born in Paula or Paola, a village of Calabria, in 1416. At the age of 13 he was the inmate of a Franciscan convent; and at 19 he retired to a cave where he inflicted on himself every species of self-mortification. The fame of his piety having attracted to his cell several emulators of his austere life, he obtained permission to erect a convent, and the new community received from Pope Sixtus IV. the title of the Hermits of St. Francis of Assisi; but the title was changed by Alexander VI. to Minim-Hermits of St. Francis of Paola. The founder established numerous communities in Italy, Sicily, France, Spain, and Germany, but the Minims were never settled in Great Britain or Ireland. Popular report having attributed to Francesco several wonderful cures, Louis XI. of France, being ill, summoned him to his presence. Francesco was received with the highest honor and attended the king on his deathbed. Charles VIII. and Louis XII. induced him to settle in France, and built him convents at Plessis-les-Tours and Amboise. Francesco died in Plessis on Good Friday, 1507, and was canonized in 1519.

FRANCHE-COMTÉ, an ancient province of France, adjacent to Switzerland and Lorraine: Its capital was Besançon, and it is now divided into the departments of Haute-Saône, Jura, and Doubs. This province, conquered by the Franks in 534, formed part of the Duchy of Burgundy, and was bestowed on Philip II. of Spain on his marriage with Isabella, daughter of Henry II. of France, in 1559. Louis XIV. conquered it in 1668, and restored it to Spain by the treaty of Aix-la-Chapelle, May 12, 1668. He conquered it again in 1674, and it was finally ceded to France by Spain, by the treaty of Nimeguen, Sept. 17, 1678.

FRANCIA, JOSE GASPAR RODRIGUEZ, dictator of Paraguay; born in Asunçion, in 1757. His mother was a Creole. Arrived at the proper age, he was sent to the University of Cordova, with a view to entering the Church; but his plans underwent a change while he was still a student, and on his return to his native town with the degree of doctor of laws, he began his public career as a barrister. He devoted himself to legal pursuits for 30 years, varying his professional avocations with a study of the French encyclopædic writers, mathematics and mechanical philosophy. In 1811, soon after the revolution in the Spanish possessions of South America became general, Dr. Francia, then in his 54th year, was appointed secretary to the independent junta of Paraguay; and on the formation of a new congress, called in 1813, he was appointed consul of the republic, with Yegros for his colleague. From this moment the affairs of his country underwent a favorable change; and the people's gratitude to their deliverer was characteristically exhibited in conferring upon him, in 1817, unlimited despotic authority, which he exercised during the remainder of his life. He died in Asunçion, Sept. 26, 1840.

FRANCIS I., King of France; born in Cognac, France, Sept. 12, 1494; succeeded to the throne in 1515, on the death of Louis XII., who died without male issue. Scarcely had he ascended, than he, as grandson of Valentino of Milan, put himself at the head of an army to assert his right over the Milanese. The Swiss, who opposed him in his entry into the duchy, were defeated at Marignano (or Melegnano), and Milan fell immediately after this victory. After a short war with England, the famous interview between Henry VIII. and Francis took

place, in 1520, in Flanders, which, from the magnificence displayed on the occasion, was called THE FIELD OF THE CLOTH OF GOLD (*q. v.*). In the same year, Charles V. of Spain, having inherited the empire after the death of Maximilian, Francis laid claim to the imperial dignity, and declared war against his rival. In this struggle, however, he met with nothing but reverses. After the defeat of Marshal Lautrec at Bicoca, in 1522, the retreat of Bonnivet, and Bayard's death, Francis was himself, in 1525, beaten at Pavia, and taken prisoner. The fight had been a fierce one, and the king wrote to his mother, "All is lost, except honor." Led captive into Spain, he only recovered his liberty at the cost of an onerous treaty, signed at Madrid in 1526; but which Francis subsequently declared null and void. He immediately recommenced war in Italy, met with fresh defeats, and concluded a second treaty at Cambrai in 1529. He once more invaded Italy, in 1536, and, after various successes, consented to a definitive arrangement at Crespi, in 1544, by which the French were excluded from Italy, though Milan was given to the Duke of Orleans, the second son of Francis. Francis was a friend to arts and literature, which flourished during his reign; and he was called the "Father of Letters." Justice, also, began to be better administered in his reign. He founded the Royal College of France, the Royal Library, and built several palaces. He died at the Château de Rambouillet, March 31, 1547, and was succeeded by his son, Henry II.

FRANCIS II., King of France, the eldest son of Henry II. and his queen Catherine de Medici; born in Fontainebleau, Jan. 19, 1543. He succeeded his father in July, 1559, having in the preceding year married Mary Stuart, daughter of James V. of Scotland. He made the Cardinal of Lorraine first minister, and his brother, the Duke of Guise, commander-in-chief. The insolence and cruelty of their rule produced profound discontent, and led to the conspiracy of Amboise, and the beginning of the civil war between the Catholics and Protestants. The states-general were convoked at Orleans in 1560, and the Prince of Condé, who had joined the Protestants, was there arrested, and sentenced to death; but the sentence was not executed owing to the King's death in Orleans, Dec. 5, 1560.

FRANCIS I., Emperor of Germany; born Dec. 8, 1708; the son of Leopold, Duke of Lorraine. He inherited this duchy from his father, in 1729, and six years afterward exchanged it for that of Tuscany, which the death of the last of the Medicis had rendered vacant. In 1736 he married Maria Theresa, the daughter of the Emperor Charles VI. On the death of the latter, he disputed the imperial dignity with the Elector of Bavaria, whom France supported, and who took the name of Charles VII.; he was, however, defeated, and Francis reigned peacefully for 20 years. He had 16 children, among whom was Joseph II., who succeeded him, and the unfortunate Marie Antoinette. He died in Innsbruck, Aug. 18, 1765.

FRANCIS II., Emperor of Germany, and I. of Austria; born in Florence, Italy, Feb. 12, 1768, succeeded his father, Leopold II., in 1792, as Emperor of Germany, King of Bohemia, Hungary, etc. At the very commencement of his reign, he had to sustain a war against France, in which he was defeated, and was, in 1797, obliged to sign the treaty of Campo Formio, which deprived him of the Netherlands and Lombardy. In another war with France he was defeated at Marengo and lost, by the treaty of Luneville, in 1801, all his possessions on the Rhine. In a third campaign, undertaken in 1805, the French were victorious over his armies at Elchingen, Ulm, and Austerlitz; and the treaty of Pressburg still further diminished his territory. Renouncing now the title of Emperor of Germany, he took that of Austria, under the name of Francis I. He tried again the fate of battles in 1809; but the defeats of Eckmühl and Wagram led to the peace of Schönbrunn, to cement which more strongly, his daughter Maria Louisa was, in 1810, given to Napoleon I. Notwithstanding this alliance, however, he, in 1813, joined the coalition against his son-in-law. The treaties of 1815 put him again in possession of the greater portion of his territory, and he reigned peaceably till his death in Vienna, March 2, 1835. He was succeeded by his son Ferdinand.

FRANCIS FERDINAND, Austrian Archduke and heir to the throne, whose assassination was the pretext for the World War. He was the nephew of the Emperor, Franz Joseph, and was born in Gratz, in 1863. His father, the Archduke, Charles Louis, having renounced his right to the throne, after the death of the Crown Prince, Rudolph, in 1889, Francis Ferdinand, became the heir. Having finished his education, he took up an army career, then went through the usual experience in administrative affairs, customary among members of the imperial family. In so far as he made his influence felt in the policies of the Government, he was a strong reac-

tionary, being in favor of a "strong" foreign policy; in other words, he was in close sympathy with the elements which stood for the "ironing out" of the Slavic nationalities within the Empire and the gradual expansion of its territories at the expense of the Balkan nations, especially Serbia. In 1900 he contracted a morganatic marriage with the daughter of a Bohemian nobleman, the Countess Sophie Chotek, later created the Duchess of Hohenberg.

The chief claim to a place in history of Francis Ferdinand, however, will ever be based on his death. In the middle of June, 1914, the Archduke had gone to Bosnia on his first visit, since that territory had been annexed to the Empire, in 1908, to take charge of mili-



ARCHDUKE FRANCIS FERDINAND

tary maneuvers there. Before his departure he was warned by the Serbian Minister in Vienna that there was danger of a popular demonstration being made against him by the Serbian population of the annexed province.

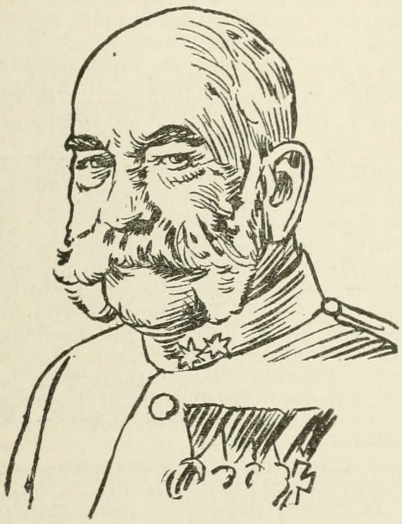
On arriving in Sarajevo, June 28, 1914, the Archduke, his wife and their party proceeded from the railroad station to the town hall, where the provincial authorities were gathered to receive them. On the way a bomb was thrown from the roof of a house into the Archduke's automobile, but he had the presence of mind to catch the missile in his hand before it exploded and hurl it out into the street, where it burst without doing any harm except slightly wounding one of his adjutants. The assailant, a Serbian by the name of Gabrinovics, was arrested on the spot. On arriving at the town hall, the Archduke proceeded to berate the officials for the attempt on his life, accusing them of not having taken proper precautions. The ceremony of welcoming him then proceeded.

On leaving the town hall, and after the Archduke had seated himself in his automobile, a man rushed out of the crowd on the sidewalk and emptied the contents of an automatic revolver into both the Archduke and his wife, who were both killed. This second assailant was arrested, and also proved to be a Serbian, by the name of Prinzip.

The Austrian Government immediately took the attitude that the assassination was the result of a conspiracy by Serbian expansionists, encouraged by the Serbian Government.

FRANCIS JOSEPH I., Emperor of Austria and King of Hungary. He was born on Aug. 18, 1830, at Laxenburg Castle, near Vienna. His father was the Archduke Francis Charles, younger son of Emperor Francis I., and his mother was the Archduchess Sofia. He was carefully educated, and in 1848 served under Radetzky in Italy. On Dec. 2, 1848, following political disturbances which threatened the dissolution of the Empire, the Emperor Ferdinand abdicated and the brother, the Archduke Francis, abandoned his claims to the crown. Francis Joseph thereupon became Emperor. During the first year of his reign he carried on campaigns which resulted in the defeat of the revolting Italian provinces. He was then obliged to direct his attention to Hungary, which was in revolt, under the leadership of Louis Kossuth. This revolt was put down only with Russian aid. As a punishment, Hungary was absorbed into the Empire and was deprived of its constitutional liberties. In 1853 an attempt was made on the life of the Emperor by a Hungarian, but he escaped with a slight wound. Two years later he concluded a concordance with Pope Pius IX. by which there were restored to the Roman Catholic Church many of the liberties of which it had been deprived since the time of the Emperor Joseph II. In 1859 Francis Joseph was forced into a war with France and Sardinia. This ended with the loss of Lombardy by Austria. Following this disaster, the Emperor abandoned his former conservative policy and began many necessary measures of reform. Following the disaster of the Seven Weeks' War with Prussia, the monarchy was reconstituted on a dualistic basis in 1867. Francis Joseph always

attempted to maintain a constitutional and parliamentary régime in his dominions, and only through the respect and affection of his subjects and by means of his own personal influence, was the Dual Empire held together during the period of his long reign. On April 24, 1854, he married Elizabeth, daughter of Duke Maximilian of Bavaria. This marriage ended in an estrangement which was terminated only by the assassination of the Empress by an Italian anarchist in Geneva, on Sept. 10, 1898. The only son of Francis Joseph and Elizabeth, Rudolph, died mysteriously in his hunting lodge at Meyerling, Austria. This left an heir apparent, Archduke Francis Ferdinand, nephew of the Em-



FRANCIS JOSEPH I.

peror, whose murder on July 18, 1914, at Sarajevo, Bosnia, precipitated the World War. Throughout the long reign of Francis Joseph, public calamity and private distress were mingled. It was reported that he was forced into actual hostilities against Serbia only through the influence of his ministers and the German Emperor. The disasters suffered by the Austrian armies greatly depressed him, although he continued to perform his duties until within a few hours of his death, which occurred on Nov. 21, 1916.

Francis Joseph's reign was the longest in modern history. It lasted 67 years and exceeded that of Queen Victoria by 4½ years. He was succeeded as Emperor by Charles Francis Joseph, nephew of Francis Ferdinand and son of Archduke Otto.

FRANCIS I., King of the Two Sicilies, son of Ferdinand I.; born in Naples, Aug. 19, 1777, and twice during the lifetime of his father he carried on the government of the kingdom under the name of viceroy; first in 1812, when a constitution was granted to Sicily; and afterward in 1820, during the troubles which broke out in Naples and Palermo. He mounted the throne in 1825, and died in Naples, Dec. 8, 1830. He was succeeded by Ferdinand II. (Bomba), who, dying in 1859, was followed by Francis II., who lost his throne in 1861.

FRANCIS, DAVID ROWLAND, an American public official, born in Richmond, Ky., in 1850. He graduated from Washington University in 1870. He engaged in business and became a director and official in many important financial institutions. From 1889 to 1893, he was governor of Missouri. He was appointed Secretary of the Interior by President Cleveland, in 1896, serving for a year. He was president of the Louisiana Purchase Exposition in 1904. In 1916 he was appointed ambassador to Russia, serving until compelled to leave by the Bolshevik Government, in 1919.

FRANCIS, ST., or **FRANCIS OF ASSISI**, the founder of the order of Franciscan friars; born in Assisi, Umbria, in 1182. He was the son of a merchant, and was said to be of dissolute habits; but on recovering from a dangerous illness he became enthusiastically devout, undergoing every species of penance and mortification. Thinking his extravagance proceeded from insanity, his father had him closely confined. Being taken before the Bishop of Assisi, in order formally to resign all claim to his paternal estate, he cheerfully resigned everything. He was now looked upon as a saint, and great numbers joining him in his vow of poverty, he drew up rules for their use, which being sanctioned by Pope Innocent III., the order of Franciscans was established. In 1219 he held a chapter which was attended by 5,000 friars. After having made a fruitless effort to convert the Sultan Meleddin, he returned to Assisi, where he died, Oct. 4, 1226, and was canonized by Pope Gregory IX. in 1230.

FRANCIS DE SALES, ST., Bishop of Geneva, founder of the Order of Visitation; born of a noble Savoyard family, in the château of Sales, near Geneva, Aug. 21, 1567. He was educated by the Jesuits at Paris, studied law at Padua, and having a strong bent to theology and a religious life, entered the Church. He was sent, in 1594, with his kinsman, Louis de Sales, to preach in the Duchy

of Chablais, and bring back, if possible, to the Catholic Church the followers of Calvin. He had a large measure of success. His conferences with Théodore de Bèze, Calvin's successor, at Geneva, were, however, without result. He went to Paris in 1602, preached there with great success. The same year he was appointed Bishop of Geneva and applied himself zealously to the reform of the diocese and its monasteries. He declined the offer of a cardinal's hat. In 1610 he founded the Order of the Visitation, of which the first directress was his friend, Madame de Chantal. He was sent again to Paris in 1618. His best known works are the "Introduction to a Devout Life" and "A Treatise on the Love of God." He died in Lyons, France, in 1622; was canonized by Pope Alexander VII. in 1665.

FRANCISCAN, the followers of ST. FRANCIS (*q. v.*). Hearing accidentally in 1208, in a church the words of the Saviour (Matt. x: 9, 10), he considered that the essence of the Gospel was absolute poverty, and founded an order on this basis, which ultimately became one of the two great fraternities of mendicant friars. To manifest his humility he would not allow his followers to be called brethren (in Lat. *fratres*), but only little brothers, a designation which they still retain. Pope Innocent III., in 1210, and a council of Lateran, in 1215, approved of his rules for the government of his order, which enjoined poverty, chastity, and obedience, and in 1223 Pope Honorius III. issued a bull in his favor. He died in Assisi, in 1226, and in 1230 was canonized by Pope Gregory IX., the anniversary of his death, Oct. 4, being fixed as his festival. In 1224, Franciscans went over to England. From 1228 till 1259 they contended with the Dominicans about precedency. At the suppression of the monasteries in England under Henry VIII., 1536-1538, the Franciscans had 66 abbeys or other religious houses. Their dress was a loose garment of gray color, reaching to their ankles, and a gray cowl, covered when they went into the streets, with a cloak. They were called Grayfriars. The order, in the course of its history, split into various branches.

FRANCONIA, a name which was originally applied to the German country on both sides of the Main, which was colonized by Frankish settlers under Thierry I., eldest son of Clovis I., who succeeded to his father's German possessions in 511. Conrad, Duke or Count of Franconia, was elected King of Germany Nov. 8, 911, and princes of the same house occupied the throne from 1024 till 1250. The Emperor Wenceslaus, in 1387, divided the empire into four circles, of which Franconia and Thuringia constituted one; and Maximilian I., in 1512, erected Franconia into a distinct circle. In 1806 it was divided among Württemberg, Baden, Hesse-Cassel, the Saxon duchies, and Bavaria, but since 1814 the greater part has belonged to Bavaria, where the districts or circles of Upper, Middle, and Lower Franconia were established in 1837. Upper Franconia includes the N. E. portion of Bavaria. It is watered by numerous rivers, as the Main, Raab, Saale, etc., and it is intersected by the Fichtelgebirge and by the hilly ravines of the Böhmer-, Franken-, and Steiger-Wald. The valleys produce good crops and fruit, and the district is rich in minerals. Middle Franconia, which abuts upon Württemberg, is intersected by branches of the Franconian Jura chain, but has few rivers of importance besides the Regnitz and Altmühl, which are connected by the great Ludwig canal. It produces good wine, but is principally celebrated for its hop-gardens. Lower Franconia, which occupies the N. W. part of Bavaria, is traversed by the Spessart, the Rhöngebirge, and the Steiger-Wald, and watered by the Main and Saale. It is the richest and best cultivated of the Franconian circles, and is celebrated for the excellence of its wines, the Steiner and Leisten. The district is noted for its mineral springs at Kissingen, Brückenau, Orb, and Wipfeld. See BAVARIA.

FRANK, ROYAL THAXTER, an American military officer; born in Gray, Me., May 6, 1836; was graduated at the United States Military Academy in 1864. During the Civil War he was brevetted major and lieutenant-colonel for bravery at Fredericksburg, Dec. 13, 1862. Later was promoted colonel of the 1st United States Artillery and was in command of the Artillery School at Fort Monroe in 1888-1898. He was promoted Brigadier-General in 1898. He died March 18, 1908.

FRANKAU, GILBERT. A British novelist. He was born in 1884 and was educated at Eton. He entered his father's business on leaving school and did not commence writing till 1910. In 1912 he produced his first book, "One of Us," and during the next two years traveled around the world. He fought in the World War at Loos, Ypres, and on the Somme, became Staff Captain in 1916, and was invalided from service in 1918. In 1914 he wrote "Tid'apa,"

and during the war "The Guns," "The City of Fear," "The Woman of the Horizon," and "The Judgment of Valhalla." In 1919 appeared "One of Them."

FRANKENTHAL, a city of Germany, in the Bavarian Palatinate, eight miles N. W. of Mannheim and near the Rhine canal. As an important industrial center is especially famous for its production of iron and steel machinery, and toys, soap and cement. Pop. about 19,000.

FRANKFORT, a city of Indiana, the county-seat of Clinton co. It is on the Chicago, Indianapolis and Louisville, the Lake Erie and Western, the Vandalia, and the Toledo, St. Louis and Western railroads. It is the center of an important agricultural region. Its industries include the manufacture of kitchen cabinets, brick, lumber, agricultural implements, etc. There are several large wholesale grocer establishments and railroad repair shops. Among the important public buildings are a Carnegie library, a court house, and a high school. Pop. (1910) 8,634; (1920) 11,585.

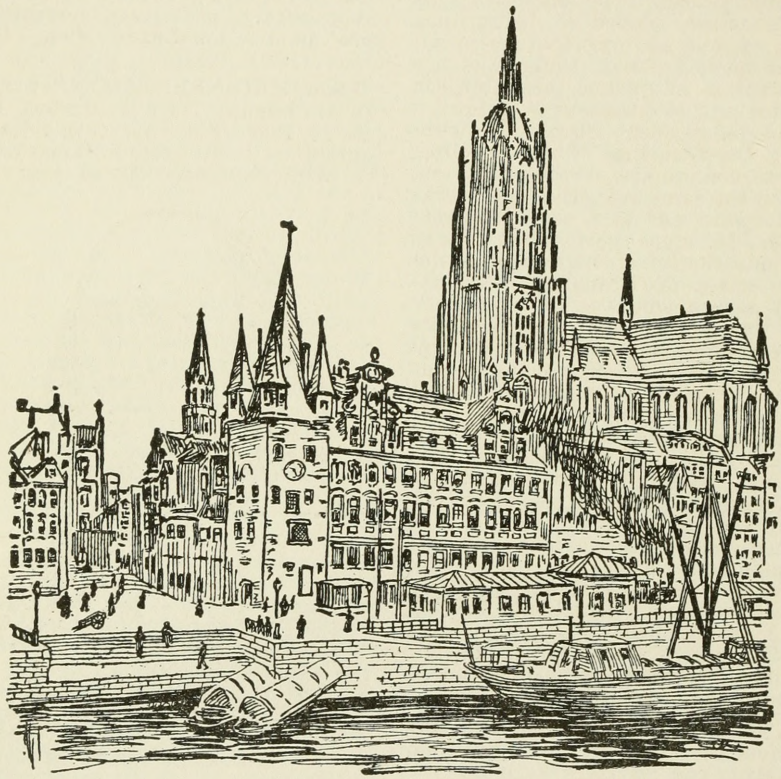
FRANKFORT, a city, capital of the State of Kentucky, and county-seat of Franklin co.; on the Kentucky river, and on the Chesapeake and Ohio, and the Louisville and Nashville railroads; 65 miles E. of Louisville. The city is built on a high plain and is regularly laid out. Here are the capitol, court house, governor's residence, the Kentucky Military Institute, the State Home for Feeble-Minded Children, State Colored Normal School, penitentiary, Young Men's Public Library, Odd Fellows' Hall, King's Daughters' Hospital, street railroad and electric light plants, waterworks, several banks, and a number of daily and weekly newspapers. It has manufactories of brooms, shoes, furniture, lumber, flour, twine, carriages. On one of the hills in the vicinity of the city is a cemetery where lie the remains of Daniel Boone, several governors, and other prominent persons of the State. Pop. (1910) 10,465; (1920) 9,805.

FRANKFORT-ON-THE-MAIN, a city of Germany, the capital of a district of same name, on the Main, 20 miles above its conflux with the Rhine. It is divided by the river into two unequal parts; the one on the N. bank, called Frankfort proper, being considerably larger than the other, which is called Sachsenhausen; and the two communicate by stone bridges. Frankfort was formerly fortified; but most of its outworks are now converted into gardens and promenades, and it is entered by nine gates. The principal streets are wide; there are also many squares, and a number of large buildings, among which may be named the Rœmerberg, or old palace, in which the emperors of Germany were elected and place of the assembling of the Diet; the Taxis palace, a place of residence of the emperors; the Saalhof, a modern imperial palace; the Lutheran, or High church; other churches, Jews' synagogues, hospitals, an academy of painting, and the Senckenberg Museum. Manufactures, carpets, table-covers, oil-cloths, cotton and silk fabrics, woolen stuffs, jewelry, tobacco and printer's black. It has also large printing, lithographic and stereotyping establishments. Frankfort was founded by the Franks in the 5th century. Charlemagne, who had a palace in this city, summoned a council in 794, and it was surrounded with walls by Louis I. in 838. It was the capital of the Eastern Franks from 843 to 889, when Ratisbon was selected. Frederick I. was elected at Frankfort in 1152. From that time it became the place of election of the emperors. Frankfort was made a free city in 1257. The bridge over the Main was built in 1342. Frederick of Prussia signed a treaty, known as the Union of Frankfort, with the empire, France, and Sweden, at this city, May 13, 1744. The French captured it Jan. 2, 1750, and again in 1792; but the Prussians wrested it from them Dec. 2, 1792. It was bombarded by the French July 12, and surrendered July 19, 1796. It formed part of the Confederation of the Rhine in 1806. Napoleon I. erected Frankfort into a duchy in 1810. The Declaration of the Allied Powers was issued at Frankfort Dec. 1, 1813. By the Congress of Vienna, in 1815, it was made one of the four free cities of Germany, and the seat of the Germanic Diet. It was made a free port in 1831. The constituent assembly, elected in 1848, held its sittings at Frankfort. It was occupied by the Prussians July 16, 1866, and is now incorporated with Prussia. Councils were held here in 794, 853, 1001, 1007 (Feb. 2), 1234, and 1400. Pop. about 415,000.

FRANKFORT - ON - THE - ODER, a well-built town of Prussia, the capital of a district of the same name, province of Brandenburg, 48 miles from Berlin. Its university, founded in 1506, was, in 1811, transferred to Breslau. Manufactures are woolens, silks, leather, earthenware, tobacco, mustard, etc. Near it is Kunersdorf, the scene of the victory of the

Austrians and Russians over Frederick the Great, in 1759. Pop. about 70,000. The district has an area of 8,000 square miles, with a population of 1,200,000.

FRANKINCENSE, a resin obtained from a great number of trees of the fir species, and greatly esteemed as an incense. The article now universally known as frankincense is the resin called thus, a common, inodorous article, little better than common white resin. The article once so highly valued, and which, with gold and myrrh, was deemed a gift to lay before the Saviour, must have been some other drug.



FRANKFORT-ON-THE-MAIN

FRANKLAND, SIR EDWARD, an English chemist; born in Churchtown, England, in 1825; studied chemistry in the Museum of Practical Geology and in Germany under Bunsen. He made the discovery of the union of organic radicles with metals, announcing in 1850 the preparation of compounds of zinc with methyl and ethyl. From this he deduced the conclusion that an atom of the metal could only attach itself to a definite number of the atoms of other elements, which discovery led to the theory of "equivalents." He was appointed Professor of Chemistry at Owens College, Manchester, in 1851, and there developed the process of making water gas. Becoming Professor of Chemistry in the Royal School of Mines in 1865 he turned his attention to water analysis, the purification of sewage and the means of preventing pollution. Subsequently he proved that compressed gases are capable of giving out a flame of constant spectrum, from which he concluded that the photosphere of the sun was atmospheric. He also investigated the chemistry of foods. He died in Norway, Aug. 11, 1899.

FRANKLAND, PERCY FARADAY, a British scientist. He was born at London in 1858, and was educated at University College School, the Royal School of Mines, and Würzburg University. He was Professor of Chemistry at Dundee, Scotland, 1888-1894, and at Birmingham, 1894-1900. He inaugurated monthly bacteriological examination of London water supply in 1885. In 1901 he was president of the Chemical Sec-

tion, British Association, Glasgow, and in 1906, of the Institute of Chemistry. He was president of the Chemical Society in 1911 and in 1919 was made officer of the Order S.S. Maurice and Lazarus. He has contributed numerous memoirs to publications and has written "Our Secret Friends and Foes," and a "Life of Pasteur."

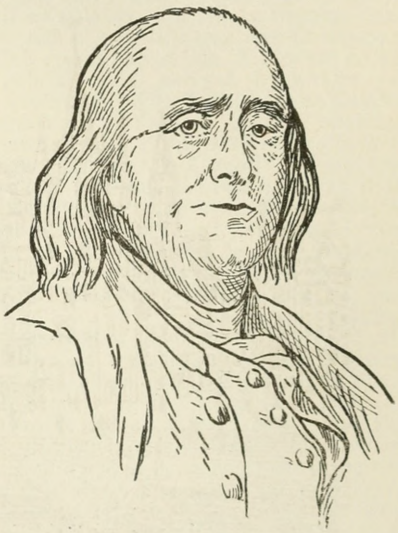
FRANKLAND, STATE OF, in 1784 North Carolina ceded her W. lands to the United States. The inhabitants of East Tennessee, piqued at being thus disposed of, and alleging that no provision was made for their defense or the administration of justice, assembled in convention and took measures to form a new and independent State. Notwithstanding the fact that North Carolina, willing to compromise, repealed the act of cession the same year, the scheme was urged forward and at a second convention, Dec. 14, steps were taken toward the organization of a separate State under the name of Frankland. A provisional government was set up. John Sevier was chosen governor, and the machinery of an independent State was put in motion. Very soon rivalries and jealousies appeared, opposing parties arose and divided the people, and a third party favoring adherence to North Carolina led by Colonel Tipton, showed much increasing strength. Party spirit ran high. Frankland had two sets of officers, and civil war became imminent. Finally an armed collision between the men under Tipton and Sevier took place. The latter were defeated, arrested and taken to prison in irons. Frankland had received its deathblow. The assembly of North Carolina passed an act of oblivion, and offered pardon to all offenders, whereupon the troubles ceased.

FRANKLIN, a city of Massachusetts, in Norfolk co. It is on the New York, New Haven, and Hartford Railroad, and includes the village of Unionville. Its industries include the manufacture of pianos, printing presses, straw hats, and cotton, woolen, and felt goods. It has an almshouse, a public library, and is the seat of Dean Academy. Pop. (1910) 5,641; (1920) 6,497.

FRANKLIN, a city of New Hampshire, in Merrimack co. It is at the junction of the Pemigewasset and Winnipesaukee rivers, which here unite to form the Merrimack, and is on the Boston and Maine Railroad. The city has excellent water power and has manufactures of paper and pulp, hosiery, knitting machines, woolen goods, lumber, etc. Franklin is the birthplace of Daniel Webster, and contains a public library and a hospital. Pop. (1910) 6,132; (1920) 6,318.

FRANKLIN, a city of Pennsylvania, the county-seat of Venango co. It is on the Allegheny river, and on the Pennsylvania, the Erie, the Lake Erie, Franklin, and Clarion, and the Lake Shore and Michigan Southern railroads. Its industries include flour mills, brick works, machine shops, and manufactures of tools. It is the center of an important oil-producing region. There are a public library, parks, and several handsome public buildings. Pop. (1910) 9,767; (1920) 9,970.

FRANKLIN, BENJAMIN, an American statesman; born in Boston, Mass., Jan. 17, 1706. When 12 years old he was apprenticed to his brother James to learn the printer's trade. Three years later



BENJAMIN FRANKLIN

James started a newspaper called the "New England Courant." Benjamin tried his hand as a contributor to the columns of the newspaper, and with such success that, when his brother was arrested and imprisoned for a month by the speaker of the assembly for a too liberal exercise of his critical faculties, the management of the paper was confided to Benjamin. Differences arose between the brothers and Benjamin left Boston, drifting finally to Philadelphia, where he landed with only $1.25 in his pocket.

He was fortunate enough to find employment immediately with a printer.

An accident secured him the acquaintance of Sir William Keith, the governor of the colony, who persuaded him to go

over to England for the requisite material to establish himself in the printing business in Philadelphia, by the promise to advance what money he would need for this purpose, and also to secure to him the printing for the government. Franklin arrived in London on Dec. 12, 1724. Instead of the letters of credit he expected he discovered that no one who knew Keith placed the smallest dependence upon his word. Franklin soon found employment in a London printing house, where he remained for the next 18 months. He then returned to Philadelphia, where in connection with a fellow printer whose father advanced some capital, he established a printing house for himself. In September, 1729, he bought for a trifle the "Pennsylvania Gazette."

In the following year, Franklin married his old love, Deborah Read, a widow, a young woman of his own station in life, by whom he had two children, a son who died in his youth, and a daughter, Sally, who afterward became Mrs. Bache, a name since associated with the history of American science. In 1732 he commenced the publication of what is still known to literature as "Poor Richard's Almanac," which gained a wide circulation. His contributions to it have been republished in many languages. In 1736 Franklin was appointed clerk of the assembly, in 1737 postmaster of Philadelphia; and shortly after he was elected a member of the assembly.

In 1746 he began those researches in electricity which gave him a position among the most illustrious natural philosophers. He exhibited in a more distinct form than heretofore the theory of positive and negative electricity; by his famous experiment with a boy's kite he proved that lightning and electricity are identical; and he it was who suggested the protecting of buildings by lightning-conductors. At the comparatively early age of 47 he was elected to the Royal Society of London. Franklin was the author of many other discoveries. They are: (1) The course of storms over the North American continent—a discovery which marked an epoch in the science of meteorology, and which has since been utilized by the aid of land and ocean telegraphy. (2) The course and most important characteristics of the Gulf Stream, its high temperature, and the consequent uses of the thermometer in navigation. (3) The diverse powers of different colors to absorb solar heat.

In 1757 he was sent to England to insist upon the right of the province to tax the proprietors of the land still held under the Penn charter for their share of the cost of defending it from hostile Frenchmen and Indians. His mission was crowned with success. He was absent on this work five years, during which he received honorory degrees from Oxford and Edinburgh. In 1764 he was again sent to England to contest the pretensions of Parliament to tax the American colonies without representation. The differences, however, became too grave to be reconciled by negotiation. The officers sent by the home government to New England were resisted in the discharge of their duty, and in 1775 patriotism as well as regard for his personal safety decided Franklin to return to the United States, where he at once participated actively in the measures and deliberations of the Colonists, which resulted in the declaration of independence, July 4, 1776.

To secure foreign assistance in prosecuting the war in which the colonies were already engaged with Great Britain, Franklin then, in the 71st year of his age, was sent to Paris. He reached the French capital in the winter of 1776-1777, where his fame as a philosopher as well as a statesman had already preceded him. His great skill as a negotiator and immense personal popularity led to an alliance between France and the United States signed by the French king Feb. 6, 1778, while opportune and substantial aids in arms and munitions of war as well as money were supplied from the royal arsenals and treasury. On Sept. 3, 1783, his mission was crowned with success through England's recognition of the independence of the United States. Franklin continued to discharge the duties of minister-plenipotentiary in Paris till 1785, when he was relieved at his own request. He reached Philadelphia Sept. 14, 1785, when he was elected almost immediately governor of Pennsylvania with but one dissenting vote besides his own. To this office he was twice re-elected unanimously. During the period of his service as governor he was also chosen a delegate to the convention which framed the Constitution of the United States. With the expiration of his third term as governor in 1788 Franklin retired from public life, after an almost continuous service of more than 40 years. Franklin was the founder and first president of the Philosophical Society of Pennsylvania, and an honorary member of all the leading scientific societies of the Old World. He died April 17, 1790, and was buried in the graveyard of Christ Church, Philadelphia.

FRANKLIN, SIR JOHN, an English navigator, born in Spilsby, Lincolnshire, April 16, 1786; when only a boy he went to sea, and later entered the Eng-

lish navy. In 1806 he was present at the battle of Trafalgar, and in 1814 at that of New Orleans, and in 1819 was appointed to head an overland expedition from Hudson's Bay to the Arctic Ocean. After suffering many hardships, he reached home in 1822. In the following year he married a Miss Purden, the daughter of an architect. In 1825 he submitted to Lord Bathurst a plan "for an expedition overland to the mouth of the Mackenzie river, and thence by sea to the N. W. extremity of America, with the combined object also of surveying the coast between the Mackenzie and Coppermine rivers." This proposition was accepted, and six days after he left Liverpool. In the same year, his wife died. In 1827 Captain Franklin arrived at Liverpool, where he was married a second time, and in 1820 had the honor of knighthood conferred upon him. In 1845, Sir John set out on a third expedition with two ships, called the "Erebus" and "Terror," and spent his first winter in a cove between Cape Riley and Beechey Island. After that period many expeditions were dispatched, both from England and America, in search of Sir John, of whom there were no tidings, and not till 1854 did the intelligence reach England that the brave navigator and his heroic companions had, in all probability, perished in the winter of 1850-1851. This intelligence, however, wanted confirmation and Lady Franklin, resolved to have the mystery cleared up. Accordingly, a last expedition was fitted out, and the news was, in 1859, at length confirmed by the return of Captain McClintock, in the yacht "Fox," after a persevering search for the lost adventurers. This officer brought with him indisputable proofs of the death of Sir John and the loss of his crew. Several articles belonging to the unfortunate explorers were found at Ross Cairn and Point Victory. At the latter place a record was discovered, wherein it was stated that Sir John Franklin had died June 11, 1847. C. F. Hall, the eminent Arctic explorer, returned in September, 1869, from a 5-years' search for the remains of Sir John Franklin's companions with more relics of the expedition. Lieutenant Schwatka found the bodies of the Franklin party in his expedition of 1879-1880.

FRANKLIN, WILLIAM BUEL, an American military officer; born in York, Pa., Feb. 27, 1823; was graduated at the United States Military Academy in 1843. In the Mexican War he served on the staff of General Taylor as a topographical engineer; was engaged in making reconnoissances and carried Taylor's orders at the battle of Buena Vista. At the outbreak of the Civil War he was assigned to the command of a brigade in Heintzelman's division. He took part in the battle of Bull Run, served with distinction in the Peninsular campaign and was promoted Major-General in 1862. Subsequently he served under McClellan in Maryland and under Burnside at Fredericksburg, was assigned to the Department of the Gulf, under Banks, in 1863; and in 1865 was brevetted Major-General in the regular army, but resigned a year later to engage in manufacturing. He was appointed United States Commissioner-General to the Paris Exposition in 1899. He died March 8, 1903.

FRANKLIN AND MARSHAL COLLEGE, an educational institution in Lancaster, Pa.; founded in 1787 under the auspices of the Reformed Church in the United States; reported at the close of 1919: Professors and instructors, 17; students, 298; president, H. H. Apple, D. D., LL.D.

FRANKLIN COLLEGE, a coeducational institution in Franklin, Ind., founded in 1834 under the auspices of the Baptist Church; reported at the close of 1919: Professors and instructors, 16; students, 259; president, C. E. Goodell, A. M.

FRANKLIN INSTITUTE, THE, of the State of Pennsylvania for the Promotion of the Mechanic Arts, an institution established in Philadelphia in 1824, for the dissemination of knowledge of the arts and sciences. It combines many features of the mechanical institutes and of the scientific societies. The work of the institution is carried on by means of lectures, reports, libraries, exhibitions, and instruction. Publication of a journal was begun in 1826 and has continued without interruption. The library contains about 75,000 volumes. A school of mechanical and architectural drawing is conducted and there are also night schools in machine design and naval architecture. There are also schools for the instruction of English and ancient and modern languages. The institute is open to all persons of legal age on payment of dues.

FRANKS, the name of a confederation which was formed about A. D. 240, by the tribes dwelling on the banks of the Lower Rhine and the Weser, who united under the title of Franks or free men. They invaded Gaul in 256, and for 12 years ravaged that country and Spain, extending their incursions as far as the opposite continent of Africa. Probus drove them back into their native marshes in 277; but their influence gradually increased, and after the death of

Constantine I., in 337, they constituted a powerful faction at the imperial court. In 355 they again invaded Gaul, and were defeated by Julian, who permitted them to establish a colony in Brabant or Taxandria. In 418 they again invaded Gaul, where, under their leader Pharamond, they founded the modern kingdom of FRANCE (*q. v.*).

FRANZ, ROBERT, a German musician; born in Halle, Prussia, June 28, 1815. He was famous for his songs, which were of a peculiar lyric beauty. His first published composition appeared in 1843. The latter years of his life were spent in editing the works of Bach, Handel, etc. He died in Halle, Oct. 24, 1892.

FRASER, MARY CRAWFORD (MRS. HUGH), an English Crawford, sister of Marion Crawford, the novelist. She was born in Rome and was educated in that city and in England. She married Hugh Fraser, who was afterward Minister of Japan, and with him traveled throughout the East, and in North and South America. She wrote much, chiefly on Japanese life and characters. Her writings include "A Diplomat's Wife in Japan" (1911); "Letters from Japan" (1904); "A Diplomat's Wife in Many Lands" (1910); "Further Reminiscences of a Diplomat's Wife" (1912); "Italian Yesterdays" (1913); and "Storied Italy" (1916).

FRATERNAL SOCIETIES. Many of the secret fraternal societies of the United States include in their obligations the payment of sick and death benefits, and fraternal care of the members when sick. Others are formed for the express purpose of insurance, the money for death payments being raised by assessments, the assessment rate either remaining stationary or increasing with the age of the member. The insurance is generally from $1,000 to $3,000. An other class of such societies is that in which the lodge principle prevails and which have the social features prominently kept in view. In these a stipulated sum is paid on the death of a member, and assessments are made on the death ratio. Among the largest of these organizations are the Odd Fellows, founded in 1819; Knights of Honor, 1873; KNIGHTS OF PYTHIAS (*q. v.*) 1864; and Royal Arcanum, 1877. The insurance paid by these varies. There are numerous other societies conducted on the same principle.

FRATERNITIES, a voluntary association of men for promoting their common interest, business or pleasure. In this wide sense it includes all secret and benevolent societies, the monastic and sacerdotal congregations, the orders of knighthood, and also guilds, trades-unions, and the like. In a limited sense it is applied to religious societies for pious practices and benevolent objects. They were often formed during the Middle Ages, from a desire of imitating the holy orders. Many of these societies, which did not obtain or seek the acknowledgment of the Church, had the appearance of separatists, which subjected them to the charge of heresy. The pious fraternities which were formed under the direction of the Church, or were acknowledged by it, were either required by their rules to afford assistence to travelers, to the unfortunate, the distressed, the sick, and the deserted, on account of the inefficiency of the police, and the want of institutions for the poor, or to perform certain acts of penitence and devotion. Of this description were the Fratres Pontifices, a brotherhood that originated in Tuscany in the 12th century, where they maintained establishments on the banks of the Arno, to enable travelers to cross the river, and to succor them in case of distress. A similar society was afterward formed in France, where they built bridges and hospitals, maintained ferries, kept the roads in repair, and provided for the security of the highways. Similar to these were the Knights and Companions of the Santa Hermandad (or Holy Brotherhood) in Spain; the Familiars and Crossbearers in the service of the Spanish Inquisition; the Calendar Brothers in Germany; the Alexians in Germany, Poland, and the Netherlands, etc. The professed object of the Alexians, so called from Alexius, their patron saint, was to visit the sick and imprisoned and to collect alms for distribution. There were also Gray Penitents (an old fraternity of an order existing as early as 1264 in Rome, and introduced into France under Henry III.), the black fraternities of Mercy and of Death; the Red, the Blue, the Green, and the Violet Penitents, so called from the color of their cowl; the divisions of each were known by the colors of the girdle or mantle. The fraternity of the Holy Trinity was founded at Rome in 1548 by Philip de Neri for the relief of pilgrims and the cured dismissed from the hospitals. The Brothers and Sisters of Charity are another fraternity whose hospitals are found in all the principal cities of Catholic Christendom. See COLLEGE FRATERNITIES.

FRATRICELLI, FRATICELLI, or FRATRICELLIANS, originally a name

assumed in the 13th century by the Franciscans by direction of their founder to mark the humble character of their claims.

Specifically, one of the names claimed in the 14th century as a monopoly by the section of the Franciscans who remained true to the rigid rules of their founder when the majority of the order gradually welcomed some relaxation of their stringency. In 1317 Pope John XXII. ordered their extirpation and many of them were cruelly put to death.

FRAUD, in law, all deceitful practices in defrauding or endeavoring to defraud another of his known right, by means of some artful device, contrary to the plain rules of common honesty. It is condemned by the common law, and punishable according to the heinousness of the offense. All frauds and deceits for which there is no remedy by the ordinary course of law are properly cognizable in equity, and, indeed, constitute one of the chief branches of cases to which the jurisdiction of chancery was originally confined.

Pious Fraud.—In Church history, a fraud considered to be "pious" because it was planned and carried out for some pious object. From the 1st to the 15th century believers in such frauds existed.

Statute of Frauds.—In English law, a statute passed in 1676. Among its complex provisions several enacted that important contracts about land, etc., should be in writing, so as to prevent the perjury which occurred when they had to be proved by parole evidence. This statute has been re-enacted in most of the States of the American Union generally with omissions, amendments, or alterations. When the words of the statute have been used, the construction put upon them has also been adopted.

FRAZIER, JAMES B., a United States senator from Tennessee, born in Pikeville, Tenn., in 1856. He graduated from the University of Tennessee in 1888 and studied law at that institution. He was admitted to the bar in 1891 and began practice in Chattanooga, Tenn. He was governor of Tennessee from 1903 to 1905, and again from 1905 to 1907. He was elected United States senator in 1905 to fill the unexpired term of William B. Bate, and resigned as governor in the same year.

FREDERIC, HAROLD, an American journalist and novelist; born in Utica, N. Y., Aug. 19, 1856. He was for many years London correspondent of the New York "Times." Among his stories are: "The Lawton Girl"; "The Valley"; "The Copperhead," a tale of the Civil War; "The Damnation of Theron Ware"; and "March Hares." He died in Hornby, England, Oct. 19, 1898.

FREDERICK, a city and county-seat of Frederick co., Md., on Carroll's creek, and on the Pennsylvania, the Baltimore and Ohio and the Frederick railroads, 62 miles W. by N. of Baltimore. Here are high schools, a convent, the State institution for the deaf and dumb, street railroads, electric lights, National and State banks, and several daily and weekly newspapers. The city has manufactories of coaches, leather, shoes, knit goods, shirt waists, palmetto, fiber brushes, tobacco, flour, etc. During the Civil War it was twice occupied by the Confederates. The second time, in 1864, by General Early, who forced the citizens to pay a ransom of $200,000. In 1862 Federal troops under General McClellan occupied the place. Pop. (1910) 10,411; (1920) 11,066.

FREDERICK I., surnamed Barbarossa, Emperor of the Holy Roman Empire, son of Frederick, Duke of Suabia; born in 1121, and was chosen to succeed his uncle Conrad III. in 1152. He had accompanied Conrad to Palestine five years previously, and his great qualities had already appeared. He was crowned at Aix-la-Chapelle a few days after his election. His great ambition was to secure the independence of the empire, and, above all, to be master of Italy. His first expedition to Italy was made in 1154, when, after subduing several towns in Lombardy, he went to Rome, and, after some delays, had himself crowned emperor by Adrian IV. He marched a second time into Italy in 1158, took Brescia and Milan, and at the celebrated diet at Roncaglia assumed the sovereignty of the towns and received the homage of the lords. On his return to Germany he triumphed over Bohemia, and made Poland tributary to the empire. After the death of Pope Adrian, Frederick had three anti-popes in succession elected in opposition to Alexander III., who excommunicated him and his Pope, Victor. The same year, 1160, he besieged and took Crema, after a most courageous defense. In 1162 he conquered Milan, and had many of the public buildings destroyed, as well as parts of the fortifications, after which the other towns of Lombardy submitted to him. Fresh revolts, excited by the tyrannical measures of his officers, recalled him to Italy in 1164; but he retired without engaging the army of the League. Again, there, in 1166, he traversed the Romagna, levied contributions on the towns, be-

sieged Ancona, and had himself crowned a second time at Rome by the anti-pope Pascal. A fresh league being formed against him, he put its members under the ban of the empire and returned to Germany. In 1174 he besieged unsuccessfully the newly founded town of Alessandria, and in the following year was totally defeated by the Milanese at Como. Soon after he made peace with the Pope and the towns of Lombardy. In 1188 he assumed the cross, set out in the following year on the third crusade, was opposed on the march by the Greek emperor and the sultan, arrived in Asia, and was drowned while crossing a river. Frederick was great, not only as a soldier, but as a ruler. His memory is still cherished among the peasants of Germany, who dream of the return of Fritz Redbeard, as the Welsh did of King Arthur. He died in June, 1190.

FREDERICK II., Emperor of the Holy Roman Empire, son of Henry VI. and Constance, of Sicily; born in Jesi, Dec. 26, 1194, elected king of the Romans in 1196, again after his father's death, and a third time on the excommunication of Otho IV., in 1211. He was already King of Sicily, and Duke of Suabia, under the joint regency of his mother and Pope Innocent II. He made a league with Philip Augustus, King of France, and after the defeat of Otho by the latter at the battle of Bouvines, was crowned at Aix-la-Chapelle in 1215. Five years still elapsed before he received the imperial crown at Rome; on which occasion he had to renew a vow previously extorted from him to take the cross. In 1225 he married Yolande, daughter of John of Brienne, King of Jerusalem, and two years later, after several delays, he embarked for the Holy Land. Illness compelled him in a few days to land again, and for this he was excommunicated by Pope Gregory IX., the first of 10 thunders of the Vatican against him. He set out again in 1228, and the Pope exciting opposition to him, and invading his hereditary states, he at once concluded a truce with Kameel, the Sultan of Egypt, by which he became master of Jerusalem. He entered the city, crowned himself (no priest daring to do it), and returned to Europe. He recovered his states, made peace with the Pope, and suppressed the revolt of his son Henry, who was then imprisoned for life. In 1235 Frederick began the war with the cities of Lombardy, having for his ally Eccelino, tyrant of Verona. After his victory of Cortenuova, most of the cities submitted to him, and he approached Rome, but did not attack it. He took Ravenna, Faenza, and Benevento; and, in 1241, his fleet, commanded by his natural son, Enzio, whom he made King of Sardinia, defeated that of the Genoese. Frederick promoted the election of Innocent IV., who had been his friend, and made a treaty with him; but he soon found Innocent a most determined enemy. Rival emperors were set up, the war in Italy continued, Parma was lost in 1248, Enzio was defeated and made prisoner in the following year. Frederick was the most accomplished sovereign of the Middle Ages; but his strong sympathies with his Italian motherland, and his endeavors to establish an all-supreme empire in Italy, caused not only his own misfortunes, but the miseries which he brought on the German empire. He died in Fiorentino, Dec. 13, 1250.

FREDERICK III., Emperor of the Holy Roman Empire, a title sometimes applied to the son of Albert I., who was chosen emperor by some of the electors in 1314, but was defeated by Louis of Bavaria and taken prisoner in 1322. He died Jan. 11, 1330. The Frederick III. of history, however, was the son of Ernst, and was born in Innsbruck, Dec. 21, 1415. He was elected emperor in 1440 and ruled for 53 years, the longest German reign. His soubriquet was "the Pacific," owing to his plans for the pacification of the empire.

He left it to his son Maximilian to carry out the device inscribed upon his palaces and books, A, E, I, O, U; which characters are generally supposed to represent the motto, *Austriæ est Imperare Orbi Universo* (Austria is to rule the world). He died in Linz, Aug. 19, 1493.

BOHEMIA

FREDERICK V., Elector-Palatine and King of Bohemia; born in Amberg, in 1596; succeeded his father, Frederick IV., in 1610. In 1618 he married the Princess Elizabeth, daughter of James I. of England, and in the following year accepted the crown of Bohemia. He made a triumphal entry into Prague, followed in 1620 by his total defeat by the Imperial forces at the battle of Prague, and the loss of his kingdom and hereditary States. He took refuge in Holland, and died in Mentz, Nov. 19, 1632.

DENMARK.

FREDERICK I., King of Denmark and Norway; born in 1473, succeeded his nephew Christiern (or Christian) II., on the deposition of the latter, in 1523, and entered into an alliance with Gustavus I., King of Sweden. After taking Copenhagen, he gained over all the nobility,

and introduced Lutheranism into his dominions. He died in 1534.

FREDERICK II., the son and successor of Christiern (or Christian) III., born in 1534, ascended the throne in 1559. He was a great friend of learning, and was a patron of Tycho Brahe and other men of science. He waged a long war with Sweden, which ended in 1570. He died in 1588.

FREDERICK III., born in 1609, succeeded his father Christiern IV., in 1648. The most remarkable event of his reign was his changing of the constitution from an elective to a hereditary monarchy. He died in 1670.

FREDERICK IV., born in 1671, ascended the throne on the death of Christiern V. in 1699. He leagued against Charles XII. of Sweden, who forced him to make peace; but when Charles fled to Turkey, Frederick drove the Swedes out of Norway, and concluded a favorable peace; retaining possession of the duchy of Schleswig. He died in 1730.

FREDERICK V., grandson of the preceding; born in 1723, and came to the throne in 1746. The character of his reign may be inferred from the following remark, which, on his deathbed, he made to his successor, Christiern VII.: "It is a great consolation to me, my son, that I have not injured any person, and that my hands are not stained with one drop of blood." He died in 1766.

FREDERICK VI., King of Denmark; born Jan. 28, 1768, ascended the throne in 1808, though, from 1784, he was associated in the government with his father, who had lost his reason. On his accession he had to repair the damages done by the English in their bombardment of Copenhagen in 1807, and to wage a war with the Swedes, who attempted to possess themselves of Norway. He succeeded in defeating them, and peace was signed at Jon Kœping, in 1809. Allying himself with Napoleon, Norway was, in 1814, given to Sweden, under Bernadotte; Pomerania and the isle of Rügen falling to Denmark. More tranquil times now arriving, Frederick devoted himself to the extension of the internal resources of his kingdom. He died Dec. 3, 1839.

FREDERICK VII., King of Denmark; born in Copenhagen, Oct. 6, 1808; and ascended the throne in 1848. He was well known as an archæologist, publishing numerous works on the subject. On his death, in Glücksburg, Nov. 15, 1863, the elder line of the house of Oldenburg became extinct.

PRUSSIA.

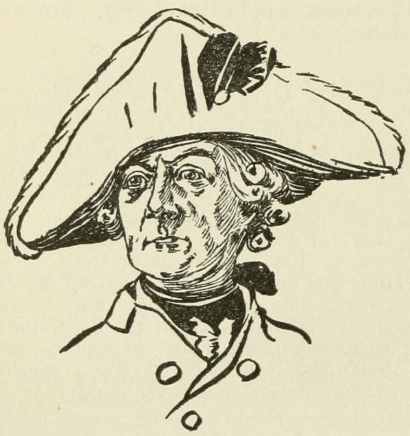
FREDERICK WILLIAM, generally called the Great Elector; born in 1620, and at the age of 20 years succeeded his father as Elector of Brandenburg. He is considered as the founder of Prussian greatness; and from him was derived much of that military spirit which became the national characteristic. He made Prussia free from feudal subjection to Poland, conquered Pomerania, joined the League against Louis XIV., and defeated the Swedes who invaded Prussia in 1647. He applied himself with much wisdom and earnestness to the promotion of the well-being of his subjects, favoring trade, making roads, etc. By affording protection to the French Protestant refugees, he gained, as citizens of the State, 20,000 industrious manufacturers, an acquisition of no slight importance to the N. of Germany; and he also gave great encouragement to agricultural improvements. He founded the library at Berlin, and a university at Duisburg; and at his death he left to his son a country much enlarged and a well-supplied treasury. He died in Potsdam, April 29, 1688.

FREDERICK I., first King of Prussia (FREDERICK III. as Elector of Brandenburg), son of the above; born in Königsberg, July 22, 1657. He succeeded his father in 1688, entered into the alliance against France, and seized Bonn and other towns, sent auxiliaries to the emperor against the Turks, and, after a dispute of some years, sold to the emperor the circle Schwiebus, which the Great Elector had acquired in exchange for the principalities of Liegnitz, Brieg, and Wohlau. He supported the emperor in the war of the Spanish Succession, and in 1701 obtained from him the title of king, which he had long coveted. Frederick gratified his love of pomp in the ceremony of his coronation at Königsberg, the cost of which exhausted his treasury for a time. He placed the crown on his head with his own hands. In 1694 he founded the University of Halle; two years later, the Berlin Academy of Painting; and, in 1707, he established the Academy of Sciences, Berlin, and made Leibnitz first president. He was thrice married; his third wife became insane, but her state was concealed from him. One day she escaped, rushed into the king's apartment, smashing the glass door, and so terrified him that he immediately fell into a fever, and after six weeks' illness died, Feb. 25, 1713.

FREDERICK WILLIAM I., son of the above, and father of Frederick the Great; born in 1688, and commenced his

reign in 1713, after having married the daughter of the Elector of Hanover, afterward George I. of England. In 1715 he declared war against Charles XII. of Sweden, and in conjunction with Denmark took Stralsund; but on the death of Charles, in 1718, he made peace. The habits of this sovereign were entirely military, and he labored unweariedly to promote the discipline of his troops. One of his strongest peculiarities was an extraordinary love for tall soldiers; and in order to procure these sons of Anak he had agents employed in all parts of Europe. He held science and literature in profound contempt; but money he worshiped, and men of a military character after his own ideal he respected and encouraged. The consequence was that he left an abundant treasury and a well-appointed army of 66,000 men. He died May 31, 1740.

FREDERICK II., commonly called Frederick the Great; born in Berlin, Jan. 24, 1712, and began to reign in 1740, found himself in possession of a full treasury



FREDERICK THE GREAT

and a powerful army, which he soon employed in attacking Austria, and conquering from her the province of Silesia (1740-1742). In 1744 he engaged in a second war with Austria, which was terminated in 1745, and left him possession of Silesia. The great struggle of the Seven Years' War bagan in 1756. Prussia was now attacked by the Austrians, the Russians, the French, the Saxons, and the Swedes, and her destruction and dismemberment seemed inevitable. England was her only ally. Prussia went through the struggle and came out triumphant. When the peace of Hubertusburg was concluded in 1763, Prussia did not cede an inch of land, or pay a dollar of money; and from that time forth she was recognized as one of the great powers of Europe. For this glorious result she was indebted to her king. Though victorious at Prague, at Rossbach, and Lissa (1757), at Zorndorf (1758), at Liegnitz and Torgau (1760), he suffered heavy defeats at Collin (1757), at Hochkirchen (1758), at Kunersdorf (1759); and his lieutenants, with the exception of Prince Ferdinand of Brunswick, were generally unsuccessful. But Frederick's firmness never failed him, even when all hope seemed lost. During his struggles against Austria and France, Frederick was regarded in England and America as the champion of Protestantism and he was called a second Gustavus Adolphus. He ill deserved the title. The disciple of Voltaire, he is supposed to have had no religious faith whatever. He died in the château of Sans Souci, near Potsdam, Aug. 17, 1786.

FREDERICK WILLIAM II., King of Prussia, nephew to Frederick the Great; born Sept. 25, 1744. He succeeded his uncle in 1786, and gave himself up, as he had long done, to low pleasures, wasting his resources on his mistresses and favorites. He entered into the Triple Alliance in 1788; made an alliance with the Porte; sent an army under the Duke of Brunswick to invade France in 1792; took part in the second partition of Poland; and made peace with France in 1795. He died Nov. 16, 1797.

FREDERICK WILLIAM III., King of Prussia, son of the above; born Aug. 3, 1770, commenced his reign in 1797 by maintaining a strict neutrality in the various alliances with and against France, which resulted from the ambitious designs of Napoleon I. In 1805, however, he yielded to the solicitations of Russia, allying himself with the czar against the French emperor. The rapid campaign of 1806, and the defeat of the Prussians at Jena, opened the gates of Berlin to the enemy, in whose hands it remained till 1809. In 1807 the battle of Friedland led to the humiliating peace of Tilsit, by which Frederick lost half his dominions. Restored to his capital, the king diligently endeavored to repair the evils of war; but new disasters overtook him, and his kingdom suffered greatly during the struggle from 1812 to 1814. Forced, in the former year, to contribute a force of 30,000 men to Napoleon's army, he subsequently joined his troops with those of Russia. The allies having triumphed over the French at Leipsic, Frederick William, in 1814, entered Paris with Czar Alexander. He

also accompanied the latter to England in the same year. On the return of Napoleon from Elba, he once more joined the allies. After the victory of Waterloo, in which the Prussians, under BLÜCHER (*q. v.*), played an important part, Prussia, once more at peace, gradually recovered the losses she had sustained, under the wise and paternal sway of Frederick, whose constant efforts and moderation contributed greatly to the maintenance of peace. He died June 7, 1840.

FREDERICK WILLIAM IV., King of Prussia, son of the preceding; born Oct. 15, 1795; on the death of his father, succeeded to the throne in 1840. He served as a simple officer, in the campaigns of 1813 and 1814, and evinced, at an early period of his life, a very great love for the arts. During the first years of his reign his subjects anxiously demanded the reform of the government, requiring the liberal constitution which had been promised them in 1815, in return for the great sacrifices they had made during the continental war. In 1847, at a general diet of the Prussian states, many of these reforms were granted. In March, 1848, the people and the troops came into collision, the king was obliged to change the ministry, to issue a general amnesty, and commence a war in favor of Schleswig against Denmark, and to salute from his balcony the corpses of the insurgents. These humiliations were somewhat softened by his hopes of becoming emperor of a united Germany, and by the success of his army in putting down an insurrection of the Poles in Posen. The mingled irresolution and absolutism of Frederick, however, led him subsequently to other conflicts in June and August of the same year; and it was not till two coups d'état that Frederick, assisted by his army, succeeded in retaining his authority almost unimpaired by the powers he had yielded. In the war between the W. powers and Russia, the king preserved a strict neutrality. In 1856, in consequence of an attack on Neufchâtel by some Prussian partisans, war was in danger of breaking out between Switzerland and Prussia; but this was avoided, and a treaty concluded, in May, 1857, in reference to the king's claims on that place. In the complication relative to the Danubian principalities, Prussia followed the lead of France and Russia as opposed to England and Austria. Toward the end of 1857, a severe illness, resulting in the loss of some of his faculties, caused his brother William to be nominated regent, who succeeded him as king on his death, near Potsdam, Jan. 2, 1861.

FREDERICK III., 2d Emperor of Germany, and 8th King of Prussia; born in Potsdam, Prussia, Oct. 18, 1831; was educated at Bonn University; entered the army; became Crown Prince of Prussia in 1861; served with distinction in the Danish War; conducted a brief but brilliant campaign in the war between Prussia and Austria; and at the outbreak of the Franco-Prussian War was placed in command of one of the three divisions of the German army. After the war he received the Iron Cross and numerous other orders in recognition of his services against the French. In 1871 he became Crown Prince of the German Empire. The death of Emperor William I. on March 9, 1888, made him Emperor of Germany and King of Prussia. He assumed the title of Frederick III. He was suffering with cancer in the throat at the time of his accession, and died in Potsdam, June 15, 1888.

POLAND.

FREDERICK AUGUSTUS II., III. See AUGUSTUS.

SAXONY.

FREDERICK III., the Wise; born in Torgau, Jan. 17, 1463; succeeded his father, Ernest, 1436, as Elector of Saxony. He is known chiefly as founder of the University of Wittenberg, and as the friend and very cautious protector of Luther, who was one of the first professors of the new university. It was by his arrangement that Luther, after the Diet of Worms, was seized and carried off to the Wartburg. He did not, however, establish the reformed faith in his dominions. He became administrator of the empire in 1519, and was offered the imperial crown, but declined it. He died May 5, 1525.

SWEDEN.

FREDERICK, King of Sweden, the eldest son of Charles, landgrave of Hesse-Cassel. He married the sister of Charles XII., on whose death, in 1718, the States of Sweden elected her queen, and in the year following consented to her resigning the crown to her husband. He had a long and unsuccessful war with Russia, which ended in a disadvantageous peace to Sweden. He then gave his energies to the pursuits of peace, restored the finances, and founded an academy at Stockholm. He died in 1751.

FREDERICKSBURG, a city in Spottsylvania co., Va.; on the S. bank of the Rappahannock river, and on the Richmond, Fredericksburg and Potomac, and the Potomac, Fredericksburg and Pied-

mont railroads; 61 miles N. of Richmond. It is situated in a valley surrounded by high hills. Here are a public library, a military school, an orphan asylum, waterworks, electric lights, a National bank, and several daily and weekly newspapers. It has tanneries, iron works, cigars, ice, and shoe factories, woolen, silk, and flour mills, etc. It was the scene of several battles during the Civil War. Pop. (1910) 5,874; (1920) 5,882.

FREDERICKSBURG, BATTLE OF. On Dec. 13, 1862, General Burnside crossed the Rappahannock river at Fredericksburg, and attacked the Confederates, who, under General Lee, occupied a strong position on the heights. The Union forces were estimated at 100,000 men and the Confederate at 80,000. The battle, after raging with desperate violence through the day, terminated in the defeat of General Burnside. Little fighting took place Dec. 14 and 15, and on Dec. 16 the Union forces recrossed the river with opposition. The Union loss was 1,138 killed, 9,105 wounded, and 2,078 missing; while the Confederate loss amounted to 595 killed, 4,061 wounded, and 653 missing.

FREDERIKSBERG, a city of Denmark, a western suburban municipality near Copenhagen, the Danish capital. It is laid out with handsome residences and public parks. One of its prominent features is the Royal Military Academy, in the Frederiksberg Palace, an ancient building of historical interest. Here, also, is located the Royal Porcelain Works, in which the king himself is financially interested. Pop. about 97,000.

FREDONIA, a village of New York, in Chautauqua co. It is on the Dunkirk, Allegheny Valley and Pittsburgh Railroad. The town is the center of an important fruit-growing region and has canning establishments and patent medicine factories. It is in the famous grape belt district of New York. The village is the seat of a State normal school and has a public library. Pop. (1910) 5,285; (1920) 6,051.

FREE CHURCH, a name often given by English Noncomformists to the Christian denominations in England free from state patronage and control. In ecclesiology and English Church history, an association which has for one object to abolish in the Church of England pew rents as well as pews, maintaining the equal right of all parishioners to the free use of seats in churches. The society was founded in 1866. This association at times aids various churches with pecuniary grants, but only if they are "free."

FREE CHURCH OF ENGLAND, an evangelical Protestant denomination founded on the basis of recognizing only two orders—the first being presbyters, and the second deacons. "Nevertheless, the first order is divided into two distinct offices, viz., bishops and presbyters. This Church maintains the ecclesiastical parity of presbyters, whether episcopally or otherwise ordained." The governing body is the Convocation, consisting of all the clergy and laity in the several churches. The impulse which gave the Church birth was communicated by the Tractarian movement of 1832, a reaction against which created a few "free churches" in the W. of England; the Shore controversy (1843-1849) and the Gorham case (1849-1850) promoted its development. It was enrolled in chancery by a deed poll in 1863. A primus was consecrated in 1876 by a bishop of the Reformed Church in America. The bishops are in the Canterbury line of Episcopal succession.

FREE CHURCH OF SCOTLAND, the name assumed by the large number of ministers and their adherents who left the Scottish Establishment at the "Disruption" of May 18, 1843. They had seceded in vindication of what they called the "Headship of Christ," *i. e.*, to gain liberty to obey what they deemed the will of their Divine Lord in all Church arrangements. When the disruption took place, the financial difficulties which the secessionists had to face were very formidable. Wherever the Free Church had adherents, which was in nearly every parish, fresh places of worship had to be provided for the ministers whose stipends were gone. All the Scottish established missionaries to the Jews or the Gentiles, having joined the seceding party, had to be provided for. Theological colleges had also to be built, day schools and manses provided in connection with the several churches. One part of the financial arrangements which has attracted most notice, was the sustentation fund.

FREE COMPANIES, bands of discharged soldiers, who ravaged France after the conclusion of the peace of Bretigny, May 8, 1360. Bertrand du Guesclin, born in Britain in 1314, put himself at their head, and led them against Peter the Cruel, King of Castile, whom he dethroned in 1365, placing Henry, Count of Trastamara, on the throne. Edward the Black Prince recalled the free companies, defeated Henry at Najara, April 3, 1367, and restored Peter the Cruel, who was, however, defeated March 14, 1369, and killed by Henry of Trastamara, March 23.

FREELAND, a borough of Pennsylvania, in Luzerne co. It is on the Lehigh Valley Railroad. It is the center of an important coal mining and agricultural region and its industries include foundries, machine shops, and silk mills. It has the Mining and Mechanical Institute, Girls' Industrial School and Hill Observatory. Pop. (1910) 6,197; (1920) 6,666.

FREEMAN, EDWARD AUGUSTUS, an English historian; born in Harborne, in Staffordshire, Aug. 2, 1823; was appointed Professor of History at Oxford, 1884. The principal of his very numerous works are: "History and Conquests of the Saracens" (1856); "History of the Norman Conquest of England" (6 vols. 1867-1879); "General Sketch of European History" (1872); "Growth of the English Constitution" (1872); "Reign of William Rufus and Accession of Henry I." (2 vols. 1882); "Fifty Years of European History" (1888). At the time of his death he was engaged on a great "History of Sicily," of which four volumes have been published. Among his miscellaneous writings are: "Lectures to American Audiences" (1882) and "Some Impressions of the United States" (1883). He was a fiery and unvarying champion of national freedom. He died in Alicante, in Spain, March 16, 1892.

FREEMANTLE, a city of Australia, the chief seaport on the West Coast of Australia, situated at the mouth of the Swan River and twelve miles from Perth. Some thirty years ago it acquired importance on account of the rush of gold hunters to this part of Australia, extensive placer diggings being developed at various points in the interior. It is now of considerable importance as the point of export of leather and lumber, and for its shipyards. A large supply of salt is obtained from the salt works established by the government on an island in the large but rather shallow harbor. The pop. is about 22,000.

FREEMASON, a member of an ancient secret order or fraternity now designated as "Free and Accepted Masons." The order is of such ancient origin that even the derivation of its name is in doubt. The most reasonable theory is that the name owes its origin to the practice of the ancient masons of giving the passed apprentice his freedom as he was sent forth to seek employment on some great and worthy structure in process of erection to complete his mechanical education. It was early in the 17th century that the word was first used in the sense in which it is now universally understood. At that time the ancient guilds of practical masons began to admit as a mark of especial esteem certain worthy persons whom it was intended to honor, not regular members of the guild through apprenticeship and occupation. To these was given the appellation "accepted." They were afterward given the title of "freemasons." In the year 1717 J. T. Desaguliers, a man of scientific knowledge and attainments, brought a number of scattered "lodges" or guilds of London under a single jurisdiction called the "Grand Lodge," and it is to this ancient and august body that all the regular lodges of the ancient craft to-day trace their origin. The first Provincial Grand Lodge in America was established at Boston in 1733 by Henry Price, who, in 1734, was made Grand Master over all of North America. The order has attained a remarkable growth throughout the world, and especially in the United States and Canada, the returns of the grand lodges of these two countries for 1919 showing 2,056,596 members.

FREEPORT, a city and county-seat of Stephenson co., Ill.; on the Pecatonica river, and on the Illinois Central, the Chicago and Northwestern, and other railroads; 121 miles W. of Chicago. It contains a public library, St. Francis Hospital, waterworks, a street railroad, electric lights, National and State banks, and daily and weekly newspapers. It has manufactories of hardware, wind-mills, wagons and buggies, and railroad shops. Pop. (1910) 17,567; (1920) 19,669.

FREEPORT, a village of Long Island, in Nassau co., New York. It is entirely a residential place, although fishing is carried on to some extent. There are a high school and two large club houses. Pop. (1910) 4,836; (1920) 8,599.

FREETHINKER, a name often assumed by those who, disbelieving in revelation, feel themselves free to adopt any opinion in religious or other matters which may result from their own independent thinking. The name was specially claimed by those who in the 17th and 18th centuries took part on the anti-Christian side in the deistic controversy.

FREETOWN, the capital of the British west African colony of Sierra Leone. It is on the left bank of the Sierra Leone river, about 5 miles from the coast. It is an important coaling station and is the headquarters of the British forces in west Africa. It has an excellent harbor which is well protected by fortifications. Among the notable buildings are a cathedral, a governor's palace, a technical school, and Fourah Bay College. Freetown is the chief seaport of west Africa and has important exports, including rubber, palm oil, nuts, and ginger. Pop. about 35,000.

FREE TRADE, the term applied to national commerce when relieved from such interference as is intended to improve or otherwise influence it; that is, unrestricted by laws or tariffs, and not unduly stimulated by bounties. In all countries it was long held to be of importance to encourage native production and manufactures by excluding from their own markets, and from the colonial markets over which they had control, the competing produce and manufactures of other countries. On this theory the great body of British commercial legislation was founded till 1846, when the policy of free trade was introduced in grain, and afterward gradually extended by the repeal of the navigation laws in 1849 and other great measures, till nearly all British commercial legislation had been brought into conforming with it. Free trade can hardly yet be said to have been adopted as a principle of commercial policy by any nation except Great Britain. As an economic principle, free trade is the direct opposite to the principle or system of protection, which maintains that a State can reach a high degree of material prosperity only by protecting its domestic industries from the competition of all similar foreign industries. To effect this, countries either prohibit the importation of foreign goods by direct legislation, or impose such duties as shall, by enhancing the price, check the introduction of foreign goods. The advocates of what is called fair trade in Great Britain profess a preference for universal or even common free trade, but seeing that Great Britain is almost the sole free trade country in the world, they declare that a policy of reciprocity is required for the protection of British traders and manufacturers. See PROTECTION.

FREIBERG (frī'bairg), a mining town of Saxony, 19 miles from Dresden. It is the capital of the mining district of Saxony, and contains a mining academy founded in 1765, with 13 professors, fine scientific collections, among which is the celebrated collection of precious stones amassed by Werner, and a large library. There is a fine relic called the Golden Portal belonging to the ancient Church, which stood on the site of the Gothic cathedral. The town owes its origin to the discovery of silver mines. It is said to have about 150 mines of silver, copper, lead, and cobalt in its vicinity; but their product has fallen off. The manufactures are chiefly metal ware, feather goods, pigments, etc. Here, on Oct. 29, 1762, Prince Henry of Prussia defeated the allied Austrian and Saxon army. Pop. about 36,000.

FREIBURG, or **FRIBOURG**, a canton of Switzerland, between the canton of Berne and the Pays de Vaud; area, 564 square miles; rivers, the Broie and the Sarine. The principal lake is Morat. Freiburg is finely diversified with every kind of scenery, Alpine mountains, and verdant valleys. It lies principally in the basin of the Aar, and in the S. and E. is traversed by branches of the Bernese Alps, in which are Mt. Moleson, Dent de Folligrau, and Dent de Breulaire, respectively 6,580, 7,710 and 7,720 feet above the level of the sea. Cattle rearing and dairy husbandry are extensively followed. The annual product of cheese is about 40,000 hundredweight, principally the famous Gruyère cheese. Peat and timber are important products. Of the population, seven-eighths are Roman Catholics. Its capital, of the same name, occupies a wild and romantic situation on the Sarine, 16 miles from Berne. The best buildings are the Jesuits' Church and the Cathedral of St. Nicholas; the latter has a spire of 376 feet in height, and an organ of 7,800 pipes. There are four bridges across the Sarine, one of which is a suspension bridge 905 feet in length. Manufactures straw hats, earthenware, tobacco, playing cards; also tanning and dyeing. Pop. about 14,000.

FREIBURG IM BREISGAU, a town of Germany, Republic of Baden; 32 miles N. N. E. of Basel. It is an open, well-built town; the walls and ditches with which it was formerly surrounded have been converted into promenades and vineyards. The cathedral, one of the most beautiful and perfect specimens of Gothic architecture in Germany, cruciform in shape, and built of red sandstone, was begun in 1122, but not completed till 1513. Its W. steeple, 381 feet high, is remarkable for its elegance and lightness. The university was founded in 1455. The chief manufactures are sewing silk, cotton and thread, buttons, artificial beads, chicory, paper, parquetry, etc. Wine and timber are the chief articles of trade. Freiburg is the seat of a Catholic archbishop. Founded in 1091 by the Duke of Zähringen, and created a town in 1115, Freiburg has repeatedly changed masters; twice it was given over to France (1679-1697 and 1744-1748). It also played an eventful part in the Thirty Years' War. In 1806 it fell to Baden; and in 1848 the Baden revolutionists were defeated here by the troops of the German confederation. Pop. about 83,000.

FREIGHT, formerly a charge paid to the owner of a ship for the carriage of goods, but this term now extends to transportation by land, especially by rail-

roads. In maritime freight the person chartering a ship pays freight for goods sent by it, and dead freight for any deficiency of cargo; the terms of the agreement are fixed by the charter party. A person sending goods by a general ship pays freight for them; and the contract takes the form of a bill of lading. So far as the rights of parties are not made the subject of positive stipulation in the contract of affreightment, they are ascertained with reference to the usage of trade. The carrier's duty is to have the ship ready to start at the time appointed (wind and weather permitting), and to receive the goods and carry them to their destination; having performed these duties, he has a lien on the goods and a right of action in case of non-payment of freight. The shipper's duty is to have his goods forwarded in time. Freight is not usually payable unless the voyage is completed; but it is sometimes prepaid, in whole or in part, at the risk of the shipper. It was formerly held that the wages of the crew depended on the earning of freight by the ships. This rule was set aside by the British Merchant Shipping Act of 1854. Even in case of shipwreck a seaman may recover his wages; but his claim will be barred if evidence can be given to show that he failed to exert himself to the utmost to save the ship and cargo. The old rule is adhered to in the United States; but it does not apply to the master, nor does it apply to seamen if freight has been lost by the fault of the master or owners. Freight is the subject of insurance. See CARRIER.

FREILIGRATH, FERDINAND (frī'lig-rät), a German poet; born in Detmold, Germany, June 17, 1810. His first volume of "Poems" (1838), won a royal pension, which he renounced as discrediting his liberalism, publishing a "Confession of Faith" in verse (1844). Banished as a sower of sedition, he took refuge in London till the Revolution of 1848. Returning, he was tried for high treason for his poem "The Dead to the Living," but acquitted; then threatened with prosecution for "Political and Social Poems"; he returned to London and lived there till 1868. Many of his songs are widely popular. He was an admirable translator, notably from Scott, Shakespeare, and Longfellow. He died in Cannstatt, Germany, March 18, 1876.

FRELINGHUYSEN, JOSEPH SHERMAN, a United States senator from New Jersey, born in Raritan, N. J. in 1869. He engaged in business and became director and officer of many important financial institutions. He was an unsuccessful candidate for the New Jersey Senate in 1902, but was elected in 1904 and again in 1908. In 1910 he was president of the Senate and acting governor of the State. In 1916 he was elected to the United States Senate.

FRELINGHUYSEN, THEODORE, an American lawyer; born in Millstone, N. J., March 28, 1787; was graduated at the College of New Jersey in 1804, and admitted to the bar in 1808. In the War of 1812 he commanded a company of volunteers, and in 1817 became attorney-general of New Jersey, which office he held till 1829 when he was elected United States Senator. He was chosen chancellor of the University of New York in 1838; was nominated for Vice-President of the United States in 1844; and in 1850 became president of Rutgers College, which position he retained until his death. He died in New Brunswick, N. J., April 12, 1862.

FREMONT, a city of Nebraska, the county-seat of Dodge co. It is on the Union Pacific, the Chicago and Northwestern, and the Chicago, Burlington and Quincy railroads. The city is an important dairying and live-stock center. Its industries include flour mills, planing mills, etc. It is the seat of the Fremont normal school, and the public buildings include a public library, court house, and a high school building. Pop. (1910) 8,718; (1920) 9,605.

FREMONT, a city of Ohio, the county-seat of Sandusky co. It is on the Lake Shore and Michigan Southern, the Lake Erie and Western, the Lake Shore Electric, and the Wheeling and Lake Erie railroads. It is also on the Sandusky river, of which it is the head of steam navigation. It is the center of an important agricultural and oil-producing region. Its manufactures include electro-carbons, engines and boilers, agricultural implements, stoves, beet sugar, flour, etc. Water power is furnished by a large dam and power plant. The city has several handsome parks, a State historical building, and a public library. It was the home of President Rutherford B. Hayes. Pop. (1910) 9,939; (1920) 12,468.

FRÉMONT, JESSIE BENTON, an American author, wife of John Charles; born in Virginia in 1824; daughter of Senator Thomas H. Benton. She published: "Story of the Guard: A Chronicle of the War," with a German translation (1863); a sketch of her father prefixed to her husband's memoirs (1886); "Souvenirs of My Time" (1887); and "The Will and the Way Stories." She died in 1902.

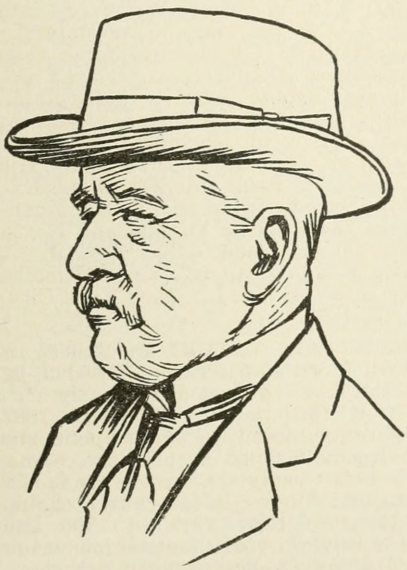
FRÉMONT, JOHN CHARLES, an American explorer, popularly known as "The Pathfinder of the Rocky Mountains"; born in Savannah, Ga., Jan. 31, 1813, of a mixed French and Virginian parentage. Though left an orphan in his fifth year, he received a good education, having, at the age of 15, entered Charleston College, where he highly distinguished himself by his proficiency in mathematics and other kindred sciences. In 1833, after a period during which he had devoted himself to the duties of a private teacher, he was appointed teacher of mathematics on board the United States sloop of war "Natchez," with which he proceeded on a cruise to South America. On his return he turned his attention to civil engineering, and was recommended to the government for employment in the exploration and survey of the mountainous region between South Carolina and Tennessee. In 1838-1839 he undertook the exploration of the country between the Missouri river and the British frontier, and in 1838 received a commission as 2d lieutenant in the corps of topographical engineers. Shortly afterward, he proposed to the government to undertake the exploration of the Rocky Mountains—at that day a terra incognita. His plan being approved, he, in 1842, started with a handful of picked men, and reached and explored the South Pass. Not only did he fix the locality of that great defile through which thousands have since found their way to California, but he defined the astronomy, geography, botany, geology, and meteorology of that region, described the route since followed, and designated the points upon which a line of United States forts were subsequently erected. In 1845 he cleared the N. part of California of Mexican troops, and then, seeking a broader field of activity, planned an expedition to the distant territory of Oregon. He approached the Rocky Mountains by a new line, scaled the summits S. of the South Pass, deflected to the Great Salt Lake, pushed investigations right and left his entire course, and at the same time connected his survey with that of Commodore Wilkes' exploring expedition. Later in the winter, without resources, adequate supplies, or as much as a guide he traversed the wilderness to the Rocky Mountains. In this daring expedition he crossed 3,500 miles of country in sight of eternal snows, discovering the grand features of Alta Cañon, California, its great basin, the Sierra Nevada, the valleys of San Joaquin and Sacramento, and determined the geographical position of the W. portion of the North American continent. In 1846 he was promoted lieutenant-colonel and also military commandant and civil governor of the Territory of California, in which capacity he in 1847 concluded those articles of capitulation by which Mexico conceded exclusive possession of that territory to the United States. In the same year he purchased in California the valuable Mariposa estate, upon which he settled in 1849. In 1853 he undertook a fifth expedition across the Continent, made new discoveries, and reached California after enduring almost incredible hardships. In 1856 he was the first candidate of the Republican party for the presidency; and in 1861, on the outbreak of the Civil War, was appointed a Major-General of volunteers. He then, as commander of the Western Union army, marched into Missouri with the view of encountering General Price's Confederate force then in possession of that State, but an unfortunate dispute with a subordinate officer caused the War Department to relieve him of his command. He was governor of Arizona in 1878-1881. His publications include: "Report of the Exploring Expedition to the Rocky Mountains in 1842, and to Oregon and North California in 1843-1844"; "Col. J. C. Frémont's Explorations"; and "Memoirs of My Life." He died in New York City, July 13, 1890.

FREMSTAD, OLIVE, an American soprano. Born at Stockholm, Sweden, in 1870, she received most of her early education at Christiania. When in 1882 her parents moved to Minneapolis she had already learned to play the piano, and in a few years she was giving music lessons and singing in the church choirs. She came to New York in 1890 and after receiving vocal instruction made her début as a concert singer two years later. From 1892-1894 she studied in Germany under Lilli Lehmann, specializing in Wagnerian operas. For the next few years she sang in the grand opera companies of Vienna, Cologne, Antwerp, and Amsterdam. In 1900 the Royal Opera in Munich and the Covent Garden in London made an arrangement to secure her services for the next three years. In 1903 she made her début with the Metropolitan Opera Company as Sieglinde. Her success was such that for eleven consecutive seasons thereafter she was one of the stars of that famous company.

FRENCH, ALICE. See THANET, OCTAVE.

FRENCH, DANIEL CHESTER, an American sculptor; born in Exeter, N. H., April 20, 1850; was educated in Boston and in Florence, Italy; had studios in Boston and Concord, N. H., in 1878-1887, and in New York City in 1887-1900. His principal works include "The Minute Man of Concord"; statues of General Cass, Rufus Choate, John Harvard, and Thomas Starr King; "Dr. Gallaudet and His First Deaf Mute Pupil"; "Statue of the Republic"; the Milmore Memorial, etc. Consult Caffin's "American Masters of Sculpture."

FRENCH, VISCOUNT JOHN DENTON PINKSTONE, British general, son of a British naval officer, born at Ripple Vale, Kent, England, in 1852. He began his career in the Royal Navy as a midshipman, which he entered in 1866, but eight years later he was



VISCOUNT FRENCH

transferred to the Army. He saw service in the Sudan with the Nineteenth Hussars, during 1884-1885. In 1889 he had reached the rank of colonel. In 1893-1894 he was Assistant Adjutant-General of Cavalry on the General Staff, and during 1895-1897 he was an assistant adjutant-general at Army Headquarters. In 1899 he became Major-General, commanding the cavalry division in Natal during the Boer War operations, and had command of operations around Colesberg, from November, 1899, to January 31, 1900. His cavalry assisted in the relief of Kimberley. In 1907, having now attained the full rank of General, he became Inspector-General of the Home Forces. In 1913 he was made Field Marshal, but early in 1914 he resigned, on account of friction with the Liberal Asquith Cabinet over the Government's military policy in Ireland. At the outbreak of the World War he immediately proffered his services and was placed in command of the British expeditionary forces sent to France. In the beginning of December, 1915, he was relieved of his command at his own instance and appointed to the command of the home forces. He was given a viscountcy in recognition of his long and faithful services. Nevertheless, there had been much criticism of the ability he had displayed in his command in France. In 1918 he was appointed Lord-Lieutenant of Ireland.

FRENCH EQUATORIAL AFRICA, or **FRENCH CONGO**, a French possession in west central Africa extending from the Atlantic Coast to the Congo river. The boundary prior to the World War was most irregular, being divided at two points by the German Kamerun, but by the Treaty of Versailles Germany ceded these regions to France. A large section of the land is still unexplored and it is only possible to estimate of its area; this is about 700,000 square miles with an estimated population of approximately 11,000,000. The land is very fertile, its numerous and large river valleys being capable of supporting a vast population. The climate is, however, unhealthful for Europeans and the population consists almost entirely of negroes. In the forests the gorilla and chimpanzee are found and along the rivers crocodiles abound. The most valuable product is rubber and the costly woods that come from the tropical forests. The exports are chiefly these and coffee. The mineral resources are believed to be extensive, particularly in the mountainous southern region.

French Equatorial Africa is divided into three colonies, Gabun, Middle Congo, and Ubangi-Shari. The three are united for administrative purposes under a governor-general, who is assisted by a secretary-general and a council of government.

FRENCH ESTABLISHMENTS IN INDIA. Territories in India which still belong to France. They are very small, their total extent being but 197 square miles, with an estimated population of 270,000. They are the French colonies of Chandernagore, Pondicherry, Karikal, Mahé, and Yanaon. The imports before the World War were valued

at nearly ten million francs and their exports at over thirty-seven million francs. It was not until 1920, however, that their trade began to recover from the serious interruption of the years 1914-1918.

FRENCH INDO-CHINA, French possessions in extreme southeast Asia, including the colonies of Cochin-China. Tongking, Laos, Annam, Cambodia, and Battambang. They are all grouped near the little kingdom of Siam whose territories have been steadily encroached upon by the French. Their estimated area in 1920 was 256,200 square miles and their population about 17,500,000. Although missionaries from France were in the country as early as Louis VIV.'s time and occasional interference by French soldiers occurred in and just after Napoleon I.'s rule, it was not until the Second Empire that the real conquest of these possessions was begun and completed. From the institution of the Third Republic the accessions to French power in this region have been steadily growing until France is now suspected of desiring to include Siam in its "sphere of influence."

The number of French in Indo-China is very small, practically all of them being connected with the administration. The capital is Saigon, where the governor-general resides, who has oversight over the four provincial governors. The exports consist largely of rice and rice products and about half the trade is done with France and the other French colonies. The French have built nearly 1,200 miles of railways in the country and have also trained and equipped a small native army under French officers, part of which took part in the European battlefields of 1914-1918.

FRENCH REVOLUTION. Although there have been not a few revolutions in France the name is always given to that extraordinary series of events which occurred between the summoning of the Estates-General in 1788 and the assumption of power by Napoleon in 1799. The Estates-General which met at Versailles on May 5, 1789, was composed of three orders: the clergy or first estate, the nobility or second estate, and the third estate, comprising representatives of all those in the nation who were not clergymen or nobles. In the previous centuries the three orders had assembled separately and voted separately and it was the intention of the king and the court party that the custom should be continued. But the deputies of the third estate were in no mood to have themselves outvoted in this manner and, under the leadership of Mirabeau, one of their number, they called upon the other two orders to join them in a single body. The king had already granted them 600 deputies, while the other two orders had about 300 apiece. As there were many of the clergy who were in sympathy with the aims of the third estate, these, with the aid of the few liberal nobles, would place the deputies of the third estate in control of the situation, provided they all sat and voted as one body, and not as three separate orders. After continued refusals on the part of the other two orders to join them, the deputies of the third estate on June 17, 1789, declared themselves a "National Assembly" and invited members of the clergy and nobility to associate themselves with them. Three days later, finding themselves excluded from their meeting places, they took the famous "Tennis Court" oath binding them to assemble together until the "constitution of the kingdom shall be established." After a weak attempt on the part of the king to force the estates to vote separately, he finally agreed to order the clergy and nobility to assemble with the deputies of the third estate in the National Assembly.

The dismissal of Necker and the actions of the court party in collecting troops in and about Paris led to a rising of the Parisians on the 14th of July and their capture of the Bastille. The necessity of preserving order and yet avoiding placing power in the king's hand led to the formation of the "National Guard," a volunteer citizen army of which Lafayette assumed command. These events stimulated the deputies at Versailles to action and on Aug. 4, 1789, they passed series of decrees abolishing feudalism, doing away with the titles of the Church, abolishing all exemptions from taxation, and declaring that "all the peculiar privileges, pecuniary or otherwise, of the provinces . . . are once for all abolished and are absorbed into the law common to all Frenchmen." Thus, at one blow, the most serious of the abuses of the old régime were remedied. France was divided into 81 departments in which all laws and taxes were to be uniform. The Assembly followed this action by passing on Aug. 26 the "Declaration of the Rights of Man," in which were stated the privileges which belong to man as man everywhere and under all conditions.

Rumors began to circulate about the beginning of October that the king, under the influence of the court, was preparing to use force to dismiss the As-

sembly and put an end to the revolution. These rumors led to a fresh outbreak of the mob of Paris which brought about a march of several thousand women to Versailles, whose purpose was to bring the king and the Assembly to Paris where they might be under the watchful eye of the Paris Commune. The women invaded the royal palace at Versailles and had it not been for the timely arrival of Lafayette and the National Guard the queen would have probably been killed. The court and Assembly obeyed the commands of the mob to return with them to Paris where the monarch was lodged in the Tuileries, while the Assembly continued its sessions in a riding school nearby. This transfer to the capital placed the Assembly under the domination of the Commune which more and more began to usurp the power of the French Government.

The unjust apportionment of the revenues of the Church, which gave the higher clergy extraordinary sums of money while the parish priests barely received a living wage, had been one of the most obvious abuses of the ancient régime. By its action of Aug. 4th the Assembly had abolished the tithes; it now confiscated to the state the immense properties of the Church, and made all the clergy dependent on the state for their revenue. The lands of the Church were sold and served as security for paper money—the assignats which the government issued in great quantities. Owing to the amount issued and to the drop in the market price of the land this paper money greatly depreciated. Equally sweeping were the changes made by a bill passed by the Assembly entitled "The Civil Constitution of the Clergy." By it the 134 bishoprics were reduced to 83, the number of the departments, and the bishops were to be elected by the people. Although the salaries of the parish priests were greatly increased by these measures, thousands of them and nearly all of the bishops refused to take the oath required of them by the state, and the harsh treatment of these "non-juring clergy" aroused the enmity of many who had hitherto wished the revolution well.

The year 1790 saw many of the French nobles leave the country and collect upon the border of France a small army, with which, with the assistance of Leopold II., the Emperor and brother of Marie Antoinette, they hoped to regain their former privileges. The result of the action of the émigrés was to further excite hostility to their fellows who remained in France. Suspicion was already general in France that the king and queen were secretly opposed to the "patriot" party, nor was this suspicion lessened by the attempted flight of the royal family from France on June 21, 1791. The National Assembly finished its work on the new Constitution the following month and gave way to the Legislative Assembly which was to operate under its provisions.

Meanwhile, on Aug. 27, 1791, the king of Prussia and the Emperor Leopold united in issuing the Declaration of Pillnitz in which they asserted their readiness to join with other powers to place the king of France in a position to form a government which "shall once more be in harmony with the rights of sovereigns and shall promote the welfare of the French nation." This idle threat, issued on the eve of the assembling of the new lawmaking body, served to throw power into the hands of the Jacobins—as the extremists of the Paris Commune were called. Radical newspapers, such as "The Friend of the People," called for the abolition of the monarchy and the establishment of a republic. The Legislative Assembly declared the property of the émigrés confiscated to the state and passed severe laws against the non-juring clergy. The deputies from the Gironde district, suspecting the patriotism of the king, urged upon the Assembly a declaration of war against Austria in which event the king would be forced to show his colors. Accordingly, France, on April 24, 1792, declared war upon Austria, thus opening a struggle which was destined to continue almost uninterrupedly for nearly twenty years.

The half-hearted measures of the king, the ill-success of the French arms, and a threatening manifesto of the commander of the Austrian-Prussian army invading France, brought about a rising of the Paris mob on Aug. 10, 1792. The king was forced to take refuge in the Assembly, while the mob placed its leaders in control of the municipal government of Paris. The uselessness of the monarchy was now apparent to all the leaders and a call was issued for a Constitutional Convention to form a new government for France. The Convention met on Sept. 21, 1792, and its first act was to declare France a republic, and to declare the twenty-second day of September as the first day of the Year One of French Liberty. The Convention was a much more radical body than either of its predecessors and more under the influence of the Paris Commune. Three weeks before

the meeting of the Convention the Parisian leaders had arrested and executed hundreds of persons suspected of sympathy with the émigrés. The purpose of these "September Massacres" was to inspire terror in the hearts of the aristocrats who still remained in France.

The problem of how to treat the king who was now rendered useless puzzled the Convention until in January, 1793, the monarch was brought before the Convention and by a small majority was sentenced to death. Louis XVI. mounted the scaffold with the dignity and composure of a martyr. His death aroused his brother monarchs to greater exertions to put down the revolution. The convention now offered the assistance of its armies to any nation whose people would throw off the yoke of monarchy and, ten days after the execution of Louis, they declared war on England. When, in March, Spain joined the enemies of France, a formidable coalition had been formed in Europe against the revolution. The loss of the Netherlands, together with the treason of one of the French generals, convinced the Convention that it had no opportunity to take thought on anything but defense. For that purpose they placed all power in the hands of a Committee composed of twelve of its members, the famous "Committee of Public Safety." From the date of the appointment of this committee in April, 1793, the reign of terror may be said to have begun. Power in the Convention had previously passed from the Girondists to the more radical "Mountain." These men believed that every trace of the ancient régime should be completely eliminated, even those who sympathized with the old régime or who were lukewarm toward the new should be put to death. The people of Paris were easy converts to this view and by their influence on the Convention imposed it on the rest of France. Robespierre and Danton were the leaders of the Mountain and, while heartless in the prosecution of their aims, few will question their ability and the sincerity of their views. Among the first to be arrested were the Girondist deputies who on June 2, 1793, were expelled from the Convention. These extreme measures brought about a serious rebellion in some of the outlying provinces, notably in La Vendée and in Lyons, which were put down only with terrible slaughter by the troops of the Convention. Meanwhile the Committee was displaying great energy in meeting the attacks of its foreign enemies. In August, Carnot, the "Organizer of Victory," was added to the body and before the end of the year he had raised and equipped the armies which expelled the invaders from French soil.

The "Reign of Terror" began in earnest with the appointment of the Revolutionary Tribunal which rapidly passed on the guilt of those brought before it and executed hundreds with hardly a trial at all. In October the former queen, Marie Antoinette, fell a victim to the guillotine, while commissioners were despatched to Nantes and other centers of disaffection who brought about the death of thousands, many of them guiltless of any crime except a doubt of the justice of the more radical of the Convention's acts. The leader of the Paris Commune, Hébert, advocated even greater excesses than these, while Danton, already tired of so much bloodshed, advocated more moderation. By careful intriguing, Robespierre brought about the death of both these men and for a space of a few months ruled as the dictator of France. His own turn came on July 27, 1794, when the reaction set in and the Convention, in defiance of the Commune, ordered his arrest and execution. Soon afterward the Convention abolished the Committee of Public Safety and resumed its task of forming a new Constitution for France. In 1795 it completed its task by establishing as the executive branch of the government a directory of five members and vesting the legislative power in two houses, a Council of Five Hundred, and a Council of Elders. In October of the same year the Convention adjourned, having brought France safely, although not without disorder, through unprecedented foreign and domestic dangers.

The success of the republican troops had forced Prussia and Spain to conclude peace with France, leaving in the spring of 1795 only Austria, England and Sardinia at war with the Republic. In 1796 the Directory despatched a rising young republican general, Napoleon Bonaparte, to Italy to force Austria to sue for peace. By a series of brilliant marches he separated Sardinia from her allies and quickly dictated peace to that little state. Turning about, he drove the Austrians from the plains of Lombardy and in 1797 pressed his offensive to within a hundred miles of Vienna. The Austrians were glad to sign the peace of Campo-Formio in October of 1797, by the terms of which the Austrian Netherlands were ceded to France together with the larger share of the Austrian possessions in Italy.

The successes of Bonaparte and his haughty demeanor alarmed the Directors and in 1798 they were glad to assent to a scheme which took him away from France. This was nothing less than his plan to strike at English commerce in the Mediterranean by seizing Egypt. Napoleon and his army successfully eluded the English fleet and by the battle of the Pyramids he destroyed the Sultan's army in Egypt. His attempt to advance into Syria met with reverses and it was only after great loss that he succeeded in making good his retreat to Alexandria. In the meanwhile Nelson had destroyed the French fleet at Aboukir, leaving the French army stranded on the Egyptian shores. By clever reporting Napoleon had concealed his defeats from the French people while magnifying his victories. The Directory was proving itself an inefficient and corrupt government, and was unable in the new European war to defend its recently gained possessions. Leaving his army in Egypt Napoleon with a few officers escaped the British patrols and landed in France. Proceeding immediately to Paris by a coup d'état he overthrew the Directory on November 9, 1799, and established himself in power as First Consul. With this event the French Revolution may be said to close.

FRENCH WEST AFRICA. By a decree of the French Government of Oct. 18, 1904, French West Africa was declared to consist of French Guinea, Senegal, Ivory Coast, Dahomey, Mauritania, Upper Senegal, and Niger, and (Decree of 1911), the military territory of the Niger. These seven colonies situated in western Africa contain an estimated area of over 1,500,000 square miles with a population close to twelve million. Taking them altogether they are perhaps the most single valuable colonial possession of France. In 1912 and 1913, the years just prior to the World War, the imports of French West Africa were valued at 150,817,649 francs and their exports reached almost the same figure. Taken together with the French Congo they represent enormous potential wealth, for their resources have not as yet been touched. The French during 1912 and 1913 carried on extensive railroad and telegraph building, as well as work in deepening harbors and improving waterways.

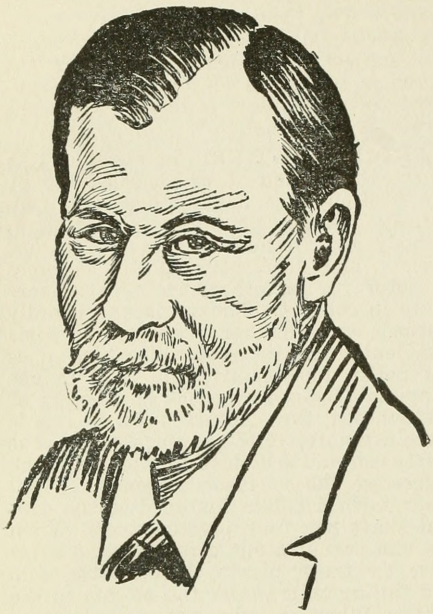
FRENEAU, PHILIP, an American poet; born in New York City, Jan. 2, 1752. His connection with Jefferson and other men of the time made him conspicuous. Among his poems are: "The Home of Night," "The College Examination," "Eutaw Springs," "The Indian Student," and "Lines to a Wild Honeysuckle." He died near Freehold, N. Y., Dec. 18, 1832.

FRESNO, a city and county-seat of Fresno co., Cal.; on the Atchison, Topeka and Santa Fé Coast Line and the Southern Pacific railroads; 208 miles S. E. of San Francisco. Here are a public library, high school, county hospital, business college, waterworks, street railroads, electric lights, National and private banks, and several daily and weekly newspapers. The chief industries are fruit growing and canning, farming, the manufacture of wine, and sheep raising. Pop. (1910) 24,892; (1920) 45,086.

FRET, in music, a small piece of wood or ivory placed upon the finger board of certain stringed instruments, to regulate the pitch of the notes produced. By pressing the string down to the finger board behind a fret, only so much of the string can be set in vibration as lies between the fret and the bridge. All the viols contained in a chest had frets, and some of the early forms of the violin were even furnished with them. But not only do they prevent the rapid fingering of difficult passages, but they also entirely deprive the violin of one of its most charming qualities, that of slurring or portamento, an attempt to produce which will, on a fretted instrument, result in a well-defined chromatic scale. Another reason for the abandonment of fretted violins was that, in extreme keys, the intervals could not be tempered. In architecture, a fret is an ornament formed by small bands or fillets, intersecting each other at right angles, used in classical architecture. It is susceptible of many modifications, and is still often employed. In heraldry, a fret is a bearing composed of bars crossed and interlaced.

FREUD, SIGMUND, an Austrian physician and psychologist, born in Freiburg, Moravia, in 1856. Having finished his education in the University of Vienna, he became assistant physician at the General Hospital, and afterward a lecturer on nervous diseases. In 1885 he went to Paris, where he studied a year under the tutorship of Charcot. In 1902 he became associate professor of neuropathy in the University of Vienna. In 1909 he paid a brief visit to the United States, where he was given the honorary degree of L.L. D. by Clark University. Dr. Freud, however, is famous on account of the study of PSYCHO-ANALYSIS, *q. v.*, so closely connected with his name, otherwise known as the theory of dreams. Briefly, the theory is that dreams are an indication of subconscious

impressions gained by early experiences, which, remaining submerged, may produce manifestations of hysteria. By special mental effort these subconscious im-



SIGMUND FREUD

pressions may be brought to the surface and the brain may be liberated from their detrimental influence.

FREWEN, MORETON, a British publicist. He was born in S. Leicestershire, England, in 1853, and was educated at Trinity College, Cambridge. After leaving school he specialized in economic subjects, and traveled considerably. In regard to Ireland he worked in the interests of Home Rule, and with the aid of the party led by William O'Brien was elected to represent East Cork in the British House of Commons during 1910-1911. He is a vice-president of the Imperial Federation League and a frequent writer in the reviews on economic problems, tariff and exchanges. He wrote "The Economic Crisis," etc.

FREYCINET, CHARLES LOUIS DE SAULCE DE, a French statesman. He was born in 1828 and received his preliminary education at the École Polytechnique. He engaged himself both with politics and engineering, and in 1870 became state engineer of mines. In the same year he was appointed Prefect of Tarn-et-Garonne, and was Minister of Public Works, 1877-1879. He then held the post of Minister of Foreign Affairs intermittently from 1879 to 1886. From 1888 to 1899 he was Minister of War, becoming in 1893 President of the Commission of the Army. Member of the French Academy; officer of the Legion of Honor; Senateur of the Seine; Inspector-General of Mines.

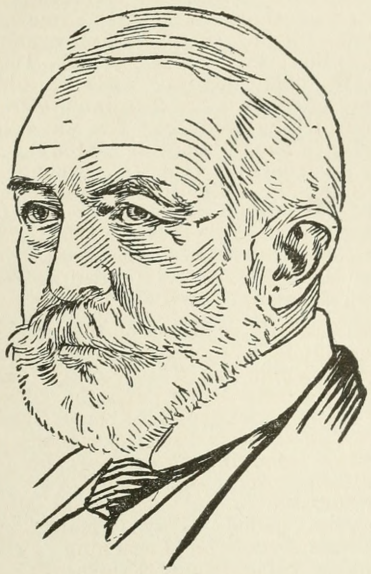
FREYTAG, GUSTAV (frī'täg), a German author; born in Kreuzburg, Prussia, July 13, 1816. His first dramatic composition was "The Bridal Tour," (1844); "The Savant" (1844), and a volume of poems, "In Breslau" (1845); after which he produced "The Valentine" (1846), "Count Valdemar" (1847), and "The Journalist" (1853). Among his works outside of the drama may be mentioned his great novel of social life, "Debit and Credit" (3 vols. 1855), "The Lost MS." (1864), "Ancestors," and "Karl Mathy" (1869). He died in Wiesbaden, Germany, April 30, 1895.

FRIAR, any religious of the male sex belonging to a monastic order. Thus, the Capuchins were originally called Friars Hermits Minor, and the Observants more permanently, Friars Observant. The term is used specifically for religious belonging to one of the four mendicant orders for men: (a) The FRANCISCANS (*q. v.*), or Friars Minor, popularly called Gray Friars; (b) the Dominicans, or Preaching Friars, popularly called Black Friars; (c) the Augustinians; (d) the Carmelities, popularly known as White Friars. In printing, a friar is a pale patch on a printed sheet.

FRICK, HENRY CLAY, an American capitalist and philanthropist. Born in Overton, Pa., in 1849, and died in 1920. He began his career as a clerk in a flour and distillery plant owned by his grandfather and later entered the business of the manufacture of coke. From a small concern this has grown to be the largest coke-producing company in the world, under the name of the H. C. Frick Coke Co. During the Homestead strike of 1892 Frick had complete direction of the company's forces and his severe measures exposed him to the hostility of the workmen. More than once during the strike attempts were made to assassinate him. At his death he left his handsome art collection to the public.

FRICOURT, a French village in the valley of the Ancre, about 12 miles S. W. of Bapaume, the center of heavy fighting on the western front, during the World War. It was the scene of especially important operations during the offensive launched by the British in the Ancre Valley, on July 1, 1916. Fricourt then marked the apex of a pronounced salient formed by the German

lines, and the British attack was launched on both sides of the village. Gradually the Germans were nipped out of this strategic point and the village was taken on the following day by the British.



HENRY C. FRICK

FRICTION, the act of rubbing two bodies together, or rubbing one body on another; in physics, the resistance which any body meets with in moving over another body. No body is quite smooth; all have elevations and depressions, and when one moves over another some of the projecting points of the one are sure to enter the cavities of the other, and render movement more difficult. Friction is greater when a body, previously at rest, first begins to move. The larger and heavier the body, the greater the friction. Friction is a retarding force in nature. It gives stability to bodies which else would be easily moved. It generates heat, and is one of the chief means of developing electricity.

Co-efficient of Friction for Two Surfaces.—The ratio between the force required to move one of these surfaces over the other, and the pressure between the two surfaces.

FRICTION CLUTCH, in machinery, a device for connecting two shafts by bringing a piece on one shaft into contact with a piece of another shaft, which revolves with such force that the former partakes of the motion of the latter. It consists of a shell or box fixed on the end of a driving shaft, fitted by a conical piece which slides on a feather or raised part of the end of another shaft, so that it can be engaged at pleasure by the cone being forced into the shell by a lever or screw. This apparatus is very useful for driving machines, the parts of which are subject to violent strains, as the pressure upon the clutch can be regulated so as to allow it to slip when the strain is abnormal.

FRICTION WHEEL, in machinery, a wheel, the motion of which is caused by the friction of a moving body, or, conversely, which communicates motion to a body by frictional contact. In one variety, one wheel being driven becomes a motor to the other, their perimeters being in contact. The surface is usually clothed with leather, rubber, or some sufficiently elastic material which does not polish too readily, and thus induce slipping. By grooving the perimeters of the wheels, the contact may be made more intimate, as the surface engaged is increased, and the elastic material of the respective faces caused to bind. In another form a collar fastened to the central shaft has four pivoted arms. When the rim turns in one direction, the arms turn on their pivots, leaving the rim and failing to transfer the motion to the shaft. When the rim turns in the contrary direction, the arms catch against it and are rotated by the contact, turning the shaft also. Another form has an upper india-rubber wheel with V-edge, clamped between two metallic plates. By screwing up the nut which holds the parts together, the disk is made to expand radially, and thus increase the tractive power on the lower driving wheel. The term friction wheel is often, but erroneously, applied to wheels which diminish friction; these are properly called anti-friction wheels.

FRIENDLY ISLANDS. See TONGA.

FRIENDLY SOCIETIES, societies formed with the view of assisting any one of their members who may be sick, infirm, or old, or who may have to meet the expense of a funeral in his family; or for providing a certain amount of support for his widow and family on his death. To obtain money for those objects, there is a fixed scale of contributions binding on all the members. Friendly societies existed among the Anglo-Saxons. An act for the encouragement of such institutions was passed by the English Parliament in 1793. See FRATERNAL SOCIETIES.

FRIENDS, SOCIETY OF, the organization commonly called Quakers, founded in the middle of the 17th century by George Fox. They are distinguished from

other Christian bodies by the special stress they lay on the immediate teaching and guidance of the Holy Spirit, and their belief that no one should be paid or appointed by human authority for the exercise of the gift of the ministry. In obedience to this belief they hold their meetings without any prearranged service or sermon, and sometimes in total silence. The Friends believe that the sacraments of Baptism and the Lord's Supper are to be taken spiritually, and not in an outward form. Their protests against the use of oaths and against the exaction of tithes and church rates cost them much suffering and frequent imprisonment during the first 50 years of their existence. The simplified dress which Friends adopted from conviction 200 years ago became stereotyped into a uniform. This dress has generally been given up, as have the "testimony" against music and singing in its rigid application, and the peculiarities of speech, such as the use of "thee" and "thou" instead of "you" (though many Friends still retain this custom among themselves), and the avoidance of all titles of courtesy. Of late years there has been a very decided evangelical movement among Friends, under the influence of which the old quietism is dying out. As a result of this change the influence of the Society beyond its own borders, through home and foreign missions and adult First Day (Sunday) Schools has developed to a remarkable extent. There is in the United States a numerous body of Friends called Hicksites (from their founder, Elias Hicks), who separated from the orthodox community. They hold latitudinarian views. The Wilburite section are conspicuous in Pennsylvania by their adherence to the livery and the "plain language." Large numbers of persons who do not appear in the statistical returns attend the Mission meetings of the Society of Friends, and very large numbers come under their influence in the foreign mission field. In the World War (1914-1918) the Friends were not enlisted as combatants because of their principles, but they performed valiant services behind the lines in hospitals, in helping refugees, etc., and in rebuilding devastated towns. See FOX, GEORGE: HICKS, ELIAS.

The Orthodox body had in 1919 94,111 communicants, 790 churches and 1,232 ministers. The other three bodies had 20,603 communicants, 218 churches and 50 ministers.

FRIEZE, in architecture, that portion of the entablature which is between the architrave and the cornice. It was generally adorned with triglyphs in the Doric order, the intervening spaces, called metopes, being filled with sculptured figures in alto-relievo, or with the skulls of oxen and wreaths alternately; while in the Corinthian and Composite orders it was ornamented with figures or scroll work in low relief, extending along its entire length. The term frieze was also applied to a broad band of sculpture, in low relief, that was frequently placed round the cella of a Grecian temple, immediately under the ceiling of the portico, and completely surrounding the exterior. In modern domestic architecture a frieze is frequently introduced immediately below the cornice of an apartment.

FRIGATE, originally a Mediterranean vessel propelled by sails and oars; afterward a ship of war, between a sloop or brig and a ship of the line. Such vessels generally carried from 30 to 50 guns on the main deck and on a raised quarter deck and forecastle. They were usually employed as cruisers or scouts. The name is now given to a vessel of war having an upper flush deck, and one covered gun deck. The armament is from 28 to 44 guns. The grade is below a ship of the line and above a corvette. The rating of ironclads is different, the guns being larger and fewer in number. A double-banked frigate is one carrying guns on two decks and having a flush upper deck.

FRIGATE BIRD, tachypetes, a genus of natatorial birds, family *Pelecanidæ*, and specially *Tachypetes aquilus*. They have a long and forked tail, and an expansion of wings sometimes reaching 12 feet. They abound on both the Atlantic and Pacific coasts of tropical America. They are called also man-of-war birds.

FRIGENTO, or **FRICENTO** (fre-tshen'to), a town of south Italy, province of Avellino, 17 miles E. N. E. of Avellino. It has a fine cathedral, containing some excellent paintings. Its inhabitants subsist by the sale of sheep, hogs, and corn. Near it is a valley, supposed, apparently on good grounds, to be identical with the Amsancti valles of Virgil. In the lowest part is an oval pool in which water boils and spouts up, at irregular intervals, accompanied by strong sulphurous and mephitic exhalations. It was through this orifice that the Fury Alecto descended to Tartarus.

FRISIANS (friz'shăns), or **FRISII** (later called Frisones), an ancient Germanic people, who inhabited the extreme N. W. of Germany, between the mouths of the Rhine and Ems, and were subjected to the Roman power under Drusus. They were subdued by the Franks, and, on the division of the Carlovingian em-

pire, their country was divided into West Frisian (West Friesland), and East Frisian (East Friesland). The language of the Frisians is intermediate between the Anglo-Saxon and the Old Norse. Our knowledge of the old Frisian is derived from certain collections of laws; as the "Asegabuch," composed about 1200; the "Brockmerbrief," in the 13th century; the "Œpnsiger Domen," about 1300, and some others. The modern Frisian is now spoken only in a few districts, and even in these only by the peasantry.

FRITH, WILLIAM POWELL, an English painter; born in Studley, England, in 1819; became a Royal Academician in 1853; received the decoration of the Legion of Honor in 1878; honorary member of the principal art academies in Europe. His paintings include "Derby Day" (1858); "The Railway Station" (1862); and "The Marriage of the Prince of Wales" (1865). He wrote "Autobiography and Reminiscences" (1887) and "Further Reminiscences" (1888). He died in 1909.

FROBISHER, MARTIN, an English navigator; born in Doncaster, Yorkshire, England, about 1536; was a mariner by profession. In search of a N. W. passage to India and under the patronage of the Earl of Warwick, he set sail with a fleet of three vessels from Deptford in June, 1576. After exploring different parts of the Arctic coast, and entering the strait that bears his name, he returned to England, bearing with him some black ore which is said to have been gold. In consequence of this discovery he was encouraged to make two more journeys, both of which proved fruitless. In 1558 he accompanied Drake to the West Indies. On board the "Triumph" he took part in the destruction of the Spanish Armada and was knighted for his bravery. In 1594 he served Henry IV. of France against the Leaguers and Philip II. of Spain, and while attacking a fort near Brest received a mortal wound. He died in Plymouth, England, Nov. 7, 1594.

FROBISHER STRAIT, a passage between the W. side of Davis Strait and the N. side of Hudson Strait, is 240 miles long, with an average breadth of 20. It is not of any practical value as a channel of communication; and in fact it has been very seldom visited by vessels bound either W. or E. It was discovered in 1576 by Sir Martin Frobisher, an energetic English navigator.

FRÖBEL, FRIEDERICH WILHELM AUGUST, a German educator. Born in 1782 in Thuringia, his boyhood was unusually sad and his days were spent in morbid introspection. At the age of fifteen he was apprenticed to a forester, after which time he attended for a few months the University of Jena. Unable to center his attention upon any one vocation, he spent the early years of manhood drifting from one thing to another. In 1816, when he was 34 years of age, he founded a school at Griesheim and began the work which was to give him fame. Although his school was closed by the reactionary officials, its influence on education in Germany was considerable. In 1835, with the encouragement of the Swiss officials, he founded an orphanage at Burgdorf, and there he resided until his death in 1852. Fröbel was the founder of the Kindergarten and his principles in reference to the methods of instruction for children between the ages of four and twelve are recognized as fundamental in modern educational practice.

FRÖBEL, JULIUS, a German publicist; born in Griesheim, near Stadtilm, July 16, 1805; was active in the popular movements preceding and during 1848. He wrote: "The Republicans," a political drama; "Theory of Politics" (1861-1864); "America; Experiences, Studies and Travels" (1857-1858), and "A System of Social Politics" (1847). He died in Zürich, Switzerland, Nov. 6, 1893.

FROG, in zoölogy, (1) singular, the English name of the amphibious genus *Rana*, and particularly of the species *Rana temporaria*, or common frog. The genus *Rana* is distinguished from its congeners by having the tongue and tympanum distinct, the skin smooth, and the toes without claws; they are, however, pointed, and the hinder feet are united almost to the tips by a membrane. The common frog is too well known to require description. It buries itself in the mud at the approach of winter, reappearing in the spring. In the month of March it lays its eggs, which are enveloped in a gelatinous material, in water, where they float. Each female deposits from 600 to 1,200 eggs a year. By April they begin to hatch. The immature frogs which come forth are called tadpoles. They have tails, no legs, breath by gills, and are aquatic. Six or eight weeks later the legs are fully developed, the tail is absorbed, and they quit the water. The common frog is found in most parts of this country, in Europe, in the N. parts of Asia, and in the N. of Africa. *Rana esculenta* is the eatable frog, common on the European continent. *R. pipiens* is the bullfrog of North America, and *R. clamitans* the grunting or Argus frog.

(2) Plural frogs; the family *Ranidæ* of which *Rana* is the type. They have a thick body, destitute of tail; feet four, long, muscular and adapted for leaping; the larva elongate, fish-like, tailed, and without legs; the gills four on each side. The family does not include the tree frogs, which are ranked as HYLIDÆ.

In farriery, a kind of tender horny substance growing in the middle of a horse's foot.

FROHMAN, CHARLES, an American theatrical manager. Born in Sandusky, Ohio, in 1860, while yet a boy he was an advance agent of a minstrel show. Early in 1880, he entered the business of theatrical manager for several stock companies and, in 1893, became director of the Empire Theater in New York. A few years later he became the leading figure in the syndicate known as the Theatrical Trust. Among the stars brought out by Frohman are Maude Adams and John Drew. In 1905-1906 he managed E. H. Sothern and Julia Marlowe in their Shakespearean productions. The exchange of plays betwen England and America was fostered by Frohman, who was likewise interested in several London theaters. He met his death when the steamship "Lusitania" was sunk by a German submarine in May, 1915.

FROISSART, JEAN (froi'särt or frwä-sär'), French chronicler; born in Valenciennes, in Hainault, in 1337. He began at 20 to write the history of the wars of the time. His "Chronicle," covering the years 1326-1400, is of capital importance for its period. To a collection of the verses of Wenceslaus of Brabant, Froissart added some of his own, and gave to the whole the title "Meliador, or the Knight of the Golden Sun." All his extant poems were published at Brussels in 3 vols. 1870-1872. He died in Chimay, 1416 (?).

FRONDE, the name of a political faction which played a conspicuous part in French history during the minority of Louis XIV., and which gave rise to the celebrated insurrectionary movement known historically as the War of the Fronde. The members of this party obtained the derisive name of Frondeurs (slingers), from the pertinacious lampoon warfare which they waged against both the powerful minister of that day, Cardinal Mazarin, and the Queen Regent, Anne of Austria. Mazarin, as a foreigner and a parvenu, enjoyed the detestation of the French people—both patrician and proletarian—and especially had incurred the opposition of the Parliament of Paris to his measure. In 1648 Mazarin ventured on the bold step of arresting two of the most popular members of the latter body, and on the next day (*la journée des barricades*) the Parisians rose in arms, dispersed some of the royal troops sent out against them, and barricaded the approaches to the Louvre, compelling the court party to retire to St. Germain, and thus leaving Paris in the hands of the insurgents. Upon the Prince de Condé advancing to besiege the capital, the parliament called the citizens to arms, when the Prince de Conti, the Duc de Beaufort ("Le Roi des Halles," and son of Henry IV.), and numerous others of the great nobles of the kingdom, came forward to head the insurrection. The famous Cardinal de Retz also joined the movement, nor was beauty wanting, in the persons of the Duchesses de Longueville and de Montbazon, to inspire the popular cause. The Prince de Condé, too, changed sides and went over to the malcontents, with whom the court party shortly afterward patched up a treaty of peace of but brief duration. Fresh contentions arose, and Mazarin caused the arrest of Condé and Conti, two of the princes of the blood. This step on the part of the hated Italian excited a revolt in the provinces, and Marshal Turenne hastened to the rescue of the Frondeur princes, but was routed in the battle of Rethel (1650). The cardinal, however, enjoyed but a mere temporary supremacy; the parliament again agitated against him, and procured his banishment from France, leaving the Prince de Condé master of the situation. Subsequently, the contest degenerated into a war of intrigue. Some of the Frondeur leaders were influenced by the queen to desert their party, and others were bought over by the cardinal's gold. Ultimately, all parties being weary with these dissensions, the court agreed to remove Mazarin, and a general amnesty was proclaimed. Condé, who refused to be a party to these terms, now finding his cause desperate, entered the Spanish service; while Mazarin, after a time, returned to Paris, and again obtained the reins of government.

FRONTAL BONE, a bone, double in the fœtus, single in the adult, situate at the base of the cranium, at the superior part of the face. It forms the vault of the orbit, lodges the ethmoid bone in a notch in its middle part, and is articulated besides with the sphenoid, parietal, and the nasal bones, the ossa nasales, superior maxillary, and malar bones.

FRONTENAC (frônt-näk'), **LOUIS DE BUADE, COMTE DE**, a French colonial officer; born in France in 1620.

He entered the army in 1635, and at an early age became brigadier. In 1672 he was appointed governor of the French possessions in North America, to be recalled 10 years later, in consequence of endless quarrels with his intendant and the Jesuits. He had gained the confidence of the settlers and the respect of the Indians. In 1689, when to the attacks from the Iroquois the misery of a war with England was added, he was again sent out by the king. During the next nine years he loosed his savage allies on the villages of New England, repulsed a British attack on Quebec, and broke the power of the Iroquois. He died in Quebec, Nov. 28, 1698.

FROSCHDORF, a village in Lower Austria, rather more than 30 miles from Vienna, and not far from the frontiers of Hungary, on the right bank of the Leitha river; called by the French Frohsdorf. It is celebrated for its splendid castle, which acquired a kind of political importance, from having been, since 1844, the residence of the Duchess d'Angoulême and the rendezvous of the elder Bourbon party. After the death of the duchess it came into the possession of the Comte de Chambord.

FROST, ARTHUR BURDETT, an American illustrator and author, born in Philadelphia in 1851. He was self-taught in art and in 1900 exhibited at the Paris Exposition. He became especially noted for his drawings of animals, and for the illustration of many humorous books, including books written by himself. Among his writings are "Bull Calf and Other Tales"; "Stuff and Nonsense"; "Sports and Games in the Open"; "Book of Drawings" (1905); and "Carlo" (1913).

FROST, ROBERT, an American educator and writer, born in San Francisco in 1875. He studied at Dartmouth College in 1892 and at Harvard, from 1897 to 1899. From 1900 to 1905 he was engaged in farming in Derry, N. H., and from 1905 to 1911 was a teacher of English at the Pinkerton Academy in that town. He lived in Europe in 1912 and 1915. His first book of poems was "A Boy's Will" (1913). He first attained wide notice at the publication of the book of poems entitled "North of Boston" (1914). This placed him in the first rank of the younger American poets. "Mountain Interval" followed in 1916.

FROSTBITE, the freezing of any portion of the body by exposure to a high degree of cold. The parts of the body most exposed to the serious consequence of frostbite are those farthest from the seat of circulation, and the most exposed to a great degree of cold. These are, the toes and feet, fingers, ears, nose, and the cheeks below the eye. The effect of intense cold is, in the first place, to deaden the sensibility of the part most exposed, which it does by contracting the vessels and driving the blood from the surface; when the part, losing its healthy vitality, is unable to resist the specific influence of the surrounding cold, and quickly falls a prey to the potency of the frost, and, in a short time, a partial gives way to an absolute death, or mortification of the member or organ. The treatment of frostbite consists in coaxing back by degrees the vitality of the part; this is most prudently effected by friction, at first with snow, then with water at ordinary temperature, no warmth being applied for some time.

FROSTBURG, a city of Maryland, in Allegheny co. It is on the Western Maryland and the Cumberland and Pennsylvania railroads. Its situation at an elevation of about 2,200 feet makes it a popular summer resort. It has a State normal school and also a miners' hospital. Its industries include fire-brick and tile works, planing mills, foundries, hosiery mills, etc. It is the center of an important coal mining region. Pop. (1910) 6,026; (1920) 6,017.

FROSTED GLASS, a form of glass made by the Venetians. It has irregularly varied marble-like projecting dislocations in the intervening fissures. Suddenly plunging hot glass into cold water produces crystalline convex fractures, with a polished exterior; but the concave intervening figures are caused, first by chilling, and then reheating at the furnace, and simultaneously expanding the reheated ball of glass by blowing, thus separating the crystals from each other, and leaving open figures between, which is done preparatory to forming vases or ornaments.

FROTHINGHAM, ARTHUR LINCOLN, an American archæologist, born in Boston in 1859. He was educated in Rome and in Germany. He was a lecturer in archæology at Johns Hopkins University from 1882 to 1886. In 1887 he became a member of the faculty of Princeton University, as professor of archæology and ancient history, serving until 1906. In 1895-1896 he was director of the American School of Classical Studies at Rome. He was a member of many learned societies and was the author of "A History of Sculpture"; "Monuments of Christian Rome" (1908); "A History of Architecture"

(1915); and "Handbook of War Facts and Peace Problems" (1918).

FROTHINGHAM, OCTAVIUS BROOKS, an American clergyman; born in Boston, Mass., Nov. 26, 1822. His radical views led to the resignation of his pastorate in the Unitarian Church, Salem, Mass. He preached in Jersey City in 1855-1859; then organized the Third Unitarian Church in New York City, where he preached very radical and advanced views till the dissolution of the Church in 1879. The remainder of his life was devoted to travel and literary pursuits, his home being in Boston. His works include: "Stories from the Old Testament"; "The Religion of Humanity"; "The Cradle of the Christ"; "Memoir of W. H. Channing"; "The Safest Creed"; "Beliefs of the Unbelievers"; "Creed and Conduct"; "The Rising and the Setting Faith"; "Transcendentalism in New England"; "Recollections and Impressions"; etc. He died in Boston, Nov. 27, 1895.

FROUDE, JAMES ANTHONY (frōd), an English historian; born in Dartington, Devonshire, England, April 23, 1818. In the beginning of the Tractarian controversy he was a close friend of Newman, and was a contributor to the "Lives of the English Saints." He took orders in the Anglican Church (1844). Among his works may be mentioned: "Luther: A Short Biography" (1833); "Shadows of a Cloud" (1847); "Nemesis of Faith" (1848); "History of England from the Fall of Wolsey to the Death of Elizabeth" (12 vols. 1850-1870); "Influence of the Reformation on the Scottish Character" (1867); "The English in Ireland in the Eighteenth Century" (3 vols. 1872); "Cæsar: A Sketch" (1879); "Thomas Carlyle" (1882); "Spanish Story of the Armada" (1892). He was the successor of Edward A. Freeman in the Professorship of Modern History at Oxford. He died in London, Oct. 20, 1894.

FRUCTIDOR, the name given in October, 1793, by the French Convention to the 12th month of the republican year. It commenced on Aug. 18, and ended on Sept. 16, and was the third summer month.

FRUIT, in botany, a term applied to the ripened ovary and its contents, quite regardless of their being eatable or otherwise. In many instances, there are additions to the ovary in the form of the remains of some or all of the other parts of the flower. In the strawberry, the calyx remains, and is converted into a succulent substance, or that part of the fruit which is eaten. In the apple, both the calyx and the corolla are converted into fruit. The pineapple is composed of all the parts entering into the composition of the ovary, namely, bracts, calyx, corolla and ovary. The orange is a largely developed ovary, containing the seeds, and a succulent mass in which the refreshing juice is placed. Fruit is divided into two distinct parts, the seed and the pericarp, or investing substance. The pericarp is composed of three parts, or layers, one within the other. For example, the pericarp of the apple consists of an external layer, or skin, epicarp; the internal layer, endocarp; and the fleshy substance, sarcocarp, lying between them. Thus, the outer skin is the epicarp, the pulpy substance the sarcocarp, and the tough, thick covering to the seeds, the endocarp. The same relation is found in stone fruit, the shell of the nut being the endocarp. The epicarp, or outward covering, is less subject to variation than other parts; but the sarcocarp and endocarp assume every variety of form and consistence. The most common forms of fruit are, the pomum or apple, the drupe or peach, and plum; the glans, as the acorn; the pineapple, the fruit of which is a scaly berry, surmounted by a crown of spinous leaves. The legume, or pea; the siliqua, or pod, as in the mustard; and the bacca, or common currant, gooseberry, etc.

FRY, SIR EDWARD. British lawyer. He was born at Bristol, Eng., in 1827, and was educated at Bristol College and University College, London. He was admitted to the bar in 1854, and became Queen's Council and Bencher of Lincoln's Inn in 1869. He presided over the Royal Commission on the Irish Land Acts in 1897-1898; was Conciliator in the S. Wales Colliery Dispute in 1898; Chairman of the Departmental Committee on the Patent Laws in 1900; Arbitrator between the United States and Mexico in the Pious Funds case 1902, and Ambassador Extraordinary and First British Plenipotentiary to the Hague Peace Conference in 1907. He was successively Judge of the High Court, of the Chancery Division, and of Appeal. He died in 1918. His works include: "The Doctrine of Election"; "Treatise on the Specific Performance of Contracts"; "British Mosses"; "Studies by the Way."

FRY, ELIZABETH (GURNEY), an English philanthropist and prison reformer; born in Earlham, Norfolk, England, May 21, 1780. Brought up a Quaker by her family, she did not adapt her mode of life to that prescribed by the more orthodox of the sect till 1798, being

then induced to do so by the preaching of William Savery, an American Friend traveling in England. This change was consummated by her marriage, in 1800, with Joseph Fry, himself a "plain Friend." In 1810 Mrs. Fry joined the ministry, and thenceforward devoted herself to Christian service. By her exertions, important reforms were effected in the prison systems of Great Britain, France and Germany. She died in Ramsgate, Oct. 12, 1845.

FRYATT, CHARLES, master mariner, captain of a British merchant steamer which, on being signaled to stop by a German submarine in the North Sea in March, 1916, attempted to ram the submarine, so that the latter was compelled to submerge. For this act Captain Fryatt received a gold watch from the British Admiralty on arriving in England and was honorably mentioned in the House of Commons. In the following June Captain Fryatt, while piloting a passenger steamer across the North Sea, from Rotterdam to an English port, was captured by a German torpedo boat. A month later he was tried by court-martial at Bruges as a "franc-tireur" and sentenced to death, being executed immediately afterward. World-wide indignation was roused by this act on the part of the Germans, who thereby attempted to terrorize all skippers of merchant vessels attacked by their submarines into submitting without resistance.

FRYE, WILLIAM PIERCE, an American diplomatist; born in Lewiston, Me., Sept. 2, 1831; was graduated at Bowdoin College in 1850; and was later admitted to the bar; was a Representative in Congress in 1871-1881. In the latter year he was elected to the United States Senate; and was re-elected in 1887, 1893, 1900, 1907. He was president pro tem. of the Senate in 1896-1901; was a member of the American-Spanish Peace Commission in 1898, and after the death of Vice-President Hobart was again elected president pro tem. of the Senate. Senator Frye was for many years a member of the Senate Committee on Foreign Relations. He died in 1911.

FUCA, STRAIT OF. See JUAN DE FUCA, STRAIT OF.

FUCHSIA (fū'shyä), so named from the discoverer, Leonard Fuchs, a German botanist, a genus of *Onagracæ*, tribe *Fuchseæ*, of which it is the type. More than 50 species are known; most from the warmer parts of America, Mexico, Peru, Chile, etc., except two from New Zealand. These beautiful plants are common in gardens, conservatories, and flower pots in windows. The hybrids amount to some hundreds.

FUEL, any combustible substance which is used for the production of heat. In this extended sense of the term, alcohol, wax, tallow, coal-gas, oil, and other inflammable bodies which are occasionally used, especially in the chemical laboratory, as sources of heat as well as light, might be included under it. But the term fuel is more properly limited to coal, coke, charcoal, wood, and a few other substances, which are our common sources of heat, and as such are burnt in grates, stoves, fireplaces, and furnaces. In this country, as in England, coal, from its abundance and cheapness, is the fuel commonly employed; but in other countries, as France, Germany, etc., wood is chiefly used, either in its original state or in the form of charcoal. But whatever substance be used, the essential ultimate elements of fuel are carbon and hydrogen; and the heat which is evolved by their combustion is derived from their combination at high temperatures with the oxygen of the air; the principal results or products of this combustion are carbonic acid and water, these escaping into the atmosphere by the flue or chimney generally attached to furnaces and fireplaces. The different kinds of pit-coal give out variable quantities of heat during their combustion; upon an average, one pound of coal should raise 60 pounds of water from the freezing to its boiling point. The heating power of coke as compared with coal is nearly in the ratio of 75 to 69: a pound of good coke, heating from 64 to 66 pounds of water from 32° to 212°. A pound of turf will heat about 26 pounds of water from 32° to 212°, and a pound of dense peat about 30 pounds; by compressing and drying peat, its value as a fuel is greatly increased. The following table, by Dr. Ure, shows the quantity of water raised from 32° to 212° by one pound weight of the different combustibles enumerated in the first column; it also shows the number of pounds of boiling water which the same weight of fuel will evaporate and the quantity of atmospheric air absolutely consumed during combustion:

Combustible.	Pounds of water which a pound can raise from 32° to 212°	Pounds of boiling water evaporated by one pound	Weight of atmospheric air at 32° required to burn one pound.
Dry wood.....	35.00	6.36	5.96
Common wood.	26.00	4.72	4.47
Charcoal	73.00	13.27	11.46
Pit coal.....	60.00	10.90	9.26
Coke	65.00	11.81	11.46
Turf	30.00	5.45	4.60
Coal-gas	76.00	13.81	14.58
Oil, wax, tallow	78.00	14.18	15.00
Alcohol	52.00	9.56	11.60

FUENTERRABIA, or **FONTARABIA**, a fortified frontier and seaport town of Spain, in Biscay, province of Guipuzcoa, on a small neck of land, on the left bank of the Bidassoa, at its mouth 20 miles W. by S. of Bayonne. The town used to be reckoned one of the keys of the kingdom, but its walls were leveled by the British troops in 1813. Fuenterrabia was taken, in 1521, by Francis I. of France, in 1719, by the Duke of Berwick.

FUGGER (fög'ger), the name of a rich and illustrious family of Suabia, descended from a weaver, who originally lived in the environs of Augsburg, about 1300. They were at first successful in selling clothes, but afterward extended their dealings, and became merchants, accumulating an immense fortune. Reaching the height of their affluence at the commencement of the 16th century, they rendered considerable services to the Emperors Charles V. and Maximilian, by making them large advances. These princes bestowed titles of nobility on the Fugger family, and they soon became connected with the best blood of Germany. Promoted to the highest dignities of the empire, they did not any the more neglect the pursuits of commerce. Their riches were always forthcoming for the improvement of their birthplace, Augsburg. The best known of them are the three brothers, Ulric, James and George; and afterward Raymond and Antony, both sons of George. ULRIC received for his loans to Maximilian the countship of Kirchberg, and the seigniory of Weissenhorn, which afterward remained in the possession of his family. He was a great encourager of learning. ANTONY and RAYMOND bore, to a great extent, the expenses of the expedition of Charles V. against Algeria, obtaining from him the permission to coin money. Several of this family still exist, and Augsburg owes its position on the Continent, as a financial center, to the energy and talent of the Fuggers.

FUGITIVE SLAVE LAW, a law which was enacted by the Congress of the United States in 1850. By its provisions a slave escaping from his master into another State was to be seized and restored to his owner, and any person aiding in his flight was to be deemed guilty of having committed a penal offense. The most noted case arising during this exciting period of national history was that of Dred Scott.

FUGUE, in music, a polyphonic composition constructed on one or more short subjects or themes, which are harmonized according to the laws of counterpoint, and introduced from time to time with various contrapuntal devices; the interest in these frequently heard themes being sustained by diminishing the interval of time at which they follow each other, and monotony being avoided by the occasional use of episodes, or passages open to free treatment. The chief elements of a fugue are: (1) the subject; (2) the counter-subject, or contrapuntal harmonization of the answer by the part which has finished the enunciation of the subject; (3) the answer; (4) episodes; (5) the stretto; and (6) the pedal point.

FUKIEN, or **FOKIEN**, a province of China, situated on the sea-coast. It has an area of 46,320 square miles and an estimated population of 8,560,000. The capital is Foochow. Formosa, formerly a part of the province, was separated from it in 1886. Low mountain ranges cross from southwest to northeast. The only level tracts are found near the mouths of the Min and Lung rivers. The soil is well adapted to cultivation and produces large quantities of tea, rice, sweet potatoes, wheat, indigo, sugar, etc. There is also an important lumbering industry in the interior. Tea is grown widely. The province has been for centuries noted for its production of porcelain. The two treaty ports are Foochow and Amoy. In 1889 another port, San Tu Ao, was voluntarily opened to foreign trade.

FUKUOKA, a city of Japan, on the north coast of Kiushiu. It has a number of important buildings, including a castle, and has a public garden. Pop. about 85,000.

FULDA, LUDWIG (föl'dä), a German dramatist; born in Frankfort-on-the-Main, July 15, 1862. One of his first pieces, a comedy in verse, "Honest Men," was repeatedly put on the stage. His most successful plays are the two comedies "Under Four Eyes" (1886) and "The Wild Chase" (1888); and the drama of society "The Lost Paradise" (1890). His dramatic tale "The Talisman" (1893) was received with extraordinary favor. The French Government conferred on him the Legion of Honor in 1907.

FULLAM, or **FULHAM** (from Fulham, a suburb of London, England, which was a notorious resort of blacklegs in the reign of Queen Elizabeth), false dice.

FULLER, HENRY BLAKE, an American author; born, of New England blood, in Chicago, Ill., Jan. 9, 1857. He was intended for a mercantile career, but entered literature with "The Chevalier of Pensieri-Vani" (new ed. 1892), and "The Châtelaine of La Trinité" (1892). He next wrote "The Cliff Dwellers"

(1893), and "With the Procession" (1895), "The Puppet-Booth" (1896), "From the Other Side" (1898), short stories; "The Last Refuge" (1900); "Waldo Trench and Others" (1908).

FULLER, MELVILLE WESTON, an American jurist; born in Augusta, Me., Feb. 11, 1833; was graduated at Bowdoin College in 1853; admitted to the bar in 1855; settled in Chicago, Ill., in 1856; and practiced there till 1888. He was a delegate to the National Democratic Conventions of 1864, 1872, 1876, and 1880; and was appointed chief-justice of the United States Supreme Court April 30, 1888. In 1904-1905 Great Britain appointed him a commissioner to arbitrate at the Hague Court the case of the French flag at Muscat. He died in 1910.

FULLER, SARAH MARGARET. See OSSOLI, MARCHIONESS D'.

FULLER, THOMAS, an English historian; born in June, 1608. He was a presbyter of the Established Church and a prebendary of Salisbury Cathedral. He was a voluminous writer. His works include: "David's Heinous Sin" (1631), a poem; "History of the Holy War" (1639); "A Pisgah Sight of Palestine" (1650); "Church History of Britain" (1655). The one work for which he is now esteemed is "The Worthies of England" (folio, 1662). He died in London, England, Aug. 16, 1661.

FULLER'S EARTH, in mineralogy, smectite; an argillaceous earth, used by fullers to absorb the oil or grease with which woolen cloth has been treated during previous manufacture. Also kaolinite. In geology, a stratum belonging to the Lower Oölite, in some instances, lying in certain localities, just below the Great Oölite, while in others it is wholly absent. Its characteristic fossil is an oyster (*Ostrea acuminata*). In all about 60 mollusca are found in the fuller's earth, 50 being lamellibranchiate bivalves, 10 brachiopoda, three gasteropods, and seven or eight cephalopoda.

FULLING, a process by which cloth made of a felting fiber is condensed, strengthened, and thickened, with a loss of width and length (see FELT). In felting, the fibers—wool, for instance—slip past each other, and their toothed edges interlock, so that a continuation of the process causes them to be more and more intimately associated. The cloth is folded or rolled and treated with soapy water. It is then beaten with wooden mallets, by which the serrated edges are forced past each other and the fibers closely commingled. Precautions are taken in some cases to prevent adherence of the folds of cloth by felting together. For this purpose cotton cloth is sometimes put between the folds of woolen cloth. Fulling and felting are dependent upon the same principle. Felted cloth is made by associating the fibers, and is not woven. Woven cloth exposed to the fulling or felting action is said to be milled. Repetition of the process constitutes it double milled or treble milled, as the case may be. Each milling thickens and solidifies the cloth while diminishing its quantity.

FULMINATE, in chemistry, a salt of fulminic acid. Fulminate of mercury is prepared by dissolving 1 part of mercury in 12 parts of nitric acid; the solution is mixed with an equal volume of alcohol when cold. The mixture is then gently heated on a water bath. Red vapors are given off of nitrogen oxides and CO_2, and a large quantity of nitrous ether, aldehyde, and other products. When the liquid becomes turbid it is allowed to cool, and the salt separates out; it is purified by recrystallization from boiling water. It forms white needles, which, when heated to 186°, explode, also by friction or percussion when dry. It is used for charging percussion caps; one kilogram of mercury will make fulminate sufficient for 40,000 caps. Fulminates have been regarded as methyl cyanide in which one atom of hydrogen has been replaced by NO_2, and two atoms of hydrogen by mercury or silver. The action of chlorine on mercuric fulminate under water forms chloropicrin, $CCl_3(NO_2)$, mercuric chloride $HgCl_2$, and cyanogen chloride CnCl. Hot nitric acid decomposes mercuric fulminate, yielding carbonic acid, acetic acid, and mercuric nitrate. Hydrochloric acid converts it into mercuric chloride and mercurous oxalate. When boiled with an aqueous solution of potassium chloride it is converted into potassium fulminurate.

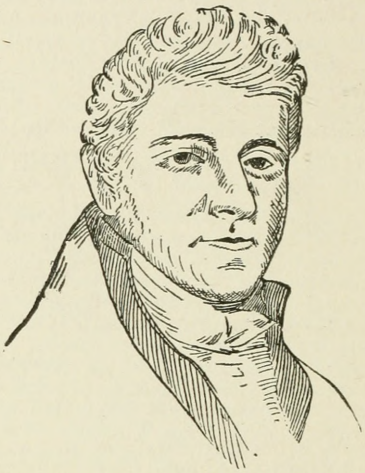
Fulminate of silver is obtained by heating nitrate of silver with strong nitric acid and alcohol till the liquid boils up. It is very dangerous to prepare. It crystallizes in small, white, opaque needles; it is very poisonous, and explodes by friction or percussion, or when heated. It is soluble in aqueous ammonia, and deposits the fulminate unaltered. When silver fulminate is digested with water and metallic copper or zinc, the silver is replaced and copper fulminate or zinc fulminate is obtained. When fulminate of copper is mixed with ammonia, and a stream of H_2C gas is passed through the solution, the copper is completely precipitated, and the filtered solution contains hydrosulphocyanic acid and urea. Fulminate of gold was discovered by a monk in the 15th century. This substance, which explodes more rapidly and with greater local force than gun-

powder, is made by precipitating a solution of chloride of gold by an excess of ammonia.

FULTON, a city of Missouri, the county-seat of Callaway co. It is on the Chicago and Alton railroad. The city is the center of an important agricultural and stock-raising region and of coal and fire clay deposits. Its industries include the manufacture of flour, fire brick, and overalls. It is the seat of the State School for the Deaf, State Hospital No. 1, an insane asylum, Westminster College, Synodical College, Conservatory of Music, and William Woods College. Pop. (1910) 5,228; (1920) 5,595.

FULTON, a city of New York, in Oswego co. It is on the Oswego river, the Oswego canal, and the New York Central, the Lackawanna, and the New York, Ontario, and Western railroads. The city has an important trade in milk and tobacco, and has manufactures of chocolate, flour, woolen goods, paper, pulp, cutlery, paper-mill machinery, motor boats, etc. It has a public library and other public buildings. Pop. (1910) 10,480; (1920) 13,043.

FULTON, ROBERT, an American inventor, celebrated as being the introducer of steam navigation; born of Irish decent, in Little Britain, Lancaster co., Pa., in 1765. Early in life he manifested a taste for painting, and repaired to England to study under Benjamin West. In that country, however, he became acquainted with the Duke of Bridgewater, the founder of the canal system of Great Britain, who induced Fulton to abandon art and study mechanical science. This nobleman was at the time engaged in a scheme of steam navigation, which he imparted to Fulton. The latter visiting Birmingham was brought into communication with James Watt, who had just succeeded in his great improvement of the steam engine, with the construction of which Fulton made himself thoroughly familiar. About this time he invented a machine for spinning flax, and another for making ropes, for which he obtained patents in England. In 1796 he published a treatise on the improvement of canal navigation. From 1797 to 1804 he resided in Paris with Mr. Joel Barlow, the American representative at the French court. During this period he invented a submarine or plunging boat, called a "Torpedo," designed to be used in naval warfare. He invited the attention of the French Government to his invention, and Bonaparte, then First Consul, appointed a commission to examine it. Several experiments were made in 1801 in the harbor of Brest. He could easily descend to any depth, or rise to the surface; and where there was no strong current, the boat was quite obedient to her helm while under water. But the motion of the boat while submerged was very slow, and it was clearly unequal to the stemming of a strong current. The French Government declined to patronize the project, and Fulton accepted an invitation from the English ministry, who also appointed a commission to test the



ROBERT FULTON

merits of his torpedo. He appears, however, to have received but little encouragement, and in 1806 he returned to the United States. Having been supplied with the necessary funds by Robert Livingston, who had been American ambassador at Paris, Fulton had the satisfaction of proving, in 1807, that steam could be applied to the propulsion of vessels with entire success. His first steamboat, called "The Clermont" (of 140 feet keel and 16½ feet beam), made a progress on the Hudson of 5 miles an hour. His second large boat on the Hudson was the "Car of Neptune," and was built in 1807. He afterward built other steam vessels, one of them a frigate which bore his name. His reputation became established, and his fortune was rapidly increasing, when his patent for steam vessels was disputed, and his opponents were in a considerable degree successful. The lawsuits about his patent rights, together with his enthusiasm, which led him to expose himself too much while directing his workmen, impaired his constitution, and he died in New York City, Feb. 24, 1815. In 1909 the centenary of the "Clemont" was celebrated in conjunction with

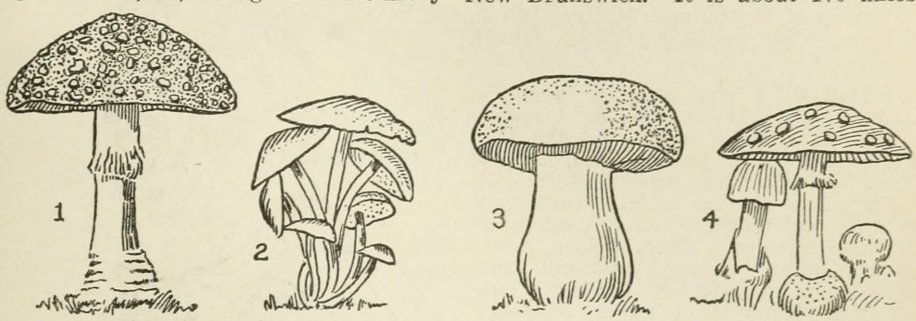
the tercentenary of the discovery of the Hudson by Hendrik Hudson.

FUNCHAL (fön-shäl′), the capital and seaport of the island of Madeira, in the center of a large bay on the S. coast. It is irregularly built; the streets are narrow, winding, ill-paved, and dirty. An old castle, which commands the roads, stands on the top of a steep, black rock, called Loo Rock, surrounded by the sea at high water. The entire produce of the island, consisting mostly of wine and sweetmeats, is exported from Funchal. Pop. about 20,000, among whom are many English, French, Portuguese, and mulatto and negro freedmen. See MADEIRA.

FUNCK-BRENTANO, THÉOPHILE (fönk-bren-tä′nō), a French philosophical and critical writer; born in Luxemburg, Aug. 20, 1830. His thorough studies in law and medicine imparted to his philosophical writings an exactitude of thought and inspired a special stress on method, as in "New Thoughts and Maxims" (1858); "Exact Thought in Philosophy" (1869); "Greek Sophists and Contemporary English Sophists" (1879); "The French Sophists" (1905).

FUNCTION, in physiology, the proper office of any organ in the animal or vegetable economy. Thus the function of the lachrymal gland is to secrete tears; of the liver, to secrete bile; of the stomach, gastric juice, the fluid to digest the food. The three most important of all the functions, as those of the heart, lungs, and brain, are called the vital functions, from being necessary for the support of the living body. In mathematics, one quantity is said to be a function of another, or of several others, when its value depends on those of the latter. Thus the area of a triangle is a function of its three sides, and $y=a+bx+cx^2$ is a function of a, b, c, and x. Functions receive distinctive names according to the nature of the dependence above referred to. Thus the function above written is said to be an algebraical function of x, since y is obtainable from x by the performance of a limited and definite number of algebraical operations. Log x, sin x, a^x, on the other hand, are said to be transcendental functions of x, and for obvious reasons receive the distinctive names of logarithmic, trigonometrical and exponential functions.

FUNDY, BAY OF, an arm of the Atlantic Ocean between Nova Scotia and New Brunswick. It is about 170 miles long, and from 30 to 50 miles wide. Opening into it are Chignecto Bay and Mines Channel at the N. extremity, and Passamaquoddy Bay near its mouth. It receives the St. John and St. Croix rivers, and though very deep, navigation is dangerous. The tide rises here to the height of 71 feet, rushing with great and dangerous rapidity.



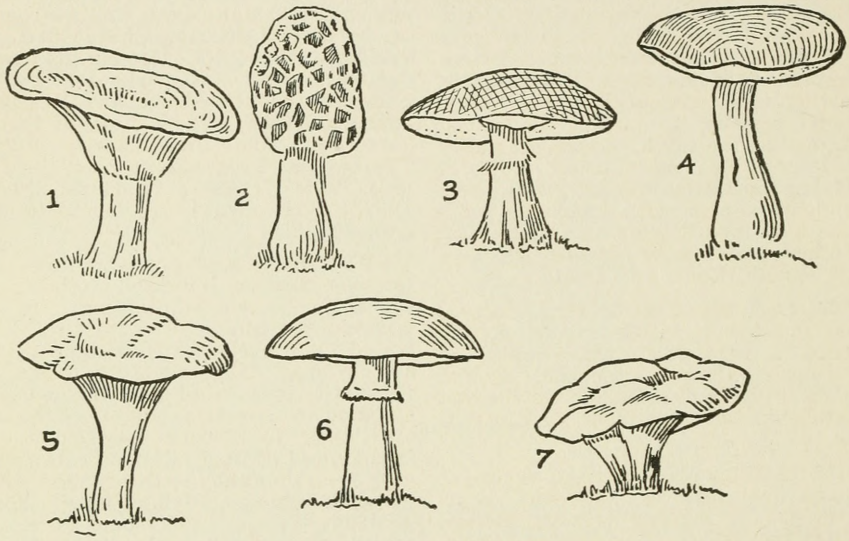
POISONOUS FUNGI

1. Fly Mushroom
2. Sulphur Tuft
3. Satan's Mushroom
4. Death-cup

FÜNEN, an island of the Danish archipelago, separated from Jütland by the strait called Little Belt; area 1,123 square miles. Its shores are deeply indented; its interior is undulating, and there are numerous lakes, streams, and marshes. The soil is productive. Products, corn, flax, hemp, and fruit. Exports, corn, cattle, horses, honey, fruit, lard, butter, leather. It trades principally with Sweden and Norway. It forms with other islands a province of DENMARK (*q. v.*). Chief towns Odense, the capital; Svendborg, and Nyeborg.

FUNGUS, in botany, the singular of fungi; a term of comprehensive meaning, used for any plant belonging to the fungal alliance. Some botanists not infrequently apply the term fungal instead of fungus. In medicine, a morbid growth suggestive of a fungus, and generally dependent on the presence of vegetable parasites.

FUNK, ISAAC KAUFFMAN, an American editor and publisher, born at Clifton, Ohio, in 1839. He was educated at Wittenberg College, Ohio. For several years he was a pastor in Brooklyn, N. Y. In 1878 he formed the publishing house of Funk and Wagnalls and published many reprints of English books. In 1889 the Literary Digest was established and in 1898 the Standard Dictionary was published. This was revised in 1913. He was an active Pronibitionist and founded in 1880 the "Voice" as an organ of that party. In his later years he became interested in psychical research and wrote "The Next Step in Evolution" (1902); and "The Psychic Riddle" (1907). He died in 1912.



EDIBLE FUNGI

1. Lacteria
2. Morel
3. Ringed Boletus
4. Rough-Stemmed Boletus
5. Chanterelle
6. Champignon
7. Hedgehog Fungus

FUNSTON, FREDERICK, an American military officer; born in Ohio, Nov. 9, 1865; was educated at the Kansas State University; engaged in newspaper work in Kansas City in 1890; was special agent of the Agricultural Department to investigate the flora of Alaska in 1893-1894; enlisted for service with the Cubans in 1896, and fought against Spain for a year and a half. When the American-Spanish War broke out he was appointed colonel of the 20th Kansas Volunteers, with which he was ordered to the Philippines, where he achieved a marked success. He was the first to enter Malolos, the capital of the Filipino insurgents, March 31, 1899. President McKinley promoted him Brigadier-General of volunteers May 2, 1899, in recognition of his fearless and brilliant feat in swimming across the Rio Grande at Calumpit under a heavy fire, and establishing a rope ferry, by means of which the Americans crossed the river and defeated the insurgents. On May 2, 1900, while cruising up the Rio Grande he espied a ladder connecting with the summit of a cliff on which he discovered numerous boxes containing Filipino documents, and all of Aguinaldo's correspondence from the time he first communicated with Dewey down to the action at Malolos. On March 23, 1901, he captured Aguinaldo at his hiding place in Palanon, Isabella province, Luzon. In recognition of this service he was commissioned a Brigadier-General, U. S. A., on March 30 following. In 1906 he commanded Dept. of California during the fire and earthquake, and in 1907-1908, troops at Goldfields, Col. In 1914 he commanded the troops in the Vera Cruz, Mexico, expedition, and in 1916 troops on the Mexican border, and had direction of the campaign to secure the Mexican bandit Villa. He died in 1919.

FUR, the coated skins of wild animals, especially of those of high N. latitudes; such as the wolf, bear, beaver, etc. For wearing, the hair or fur is cleansed, and the skin is generally slightly tanned. The most valuable furs, such as ermine and sable, come chiefly from Russia. When

unprepared, or merely dried, the furskins go under the name of peltry. (See FURS.)

FURIES (Latin *Furiæ*), in classical mythology, the three daughters of Nox and Achero, or of Pluto and Proserpine, also called the Eumenides. Sometimes they were represented young and beautiful, with or without serpents twining about their heads. These avenging deities of the ancients were called Alecto, Megara, and Tisiphone, to which some add Nemesis. They were supposed to be the ministers of the gods. Their sphere of action was consequently both in the infernal regions, to punish condemned souls, and on the earth, to rack the guilty conscience. The most usual mode of typifying the Furies was by giving them a frightful aspect, with a burning torch in one hand and a whip of scorpions in the other, and always attended by Terror, Paleness, Rage, and Death.

FURMAN UNIVERSITY, a coeducational institution in Greenville, S. C.; founded in 1854 under the auspices of the Baptist Church; reported at the close of 1919: Professors and instructors, 11; students, 300; president, S. E. Bradshaw, A. M.

FURNACE, a place where a vehement fire and heat may be made and maintained, as for melting ores or metals, heating the boiler of a steam engine, warming a house, baking pottery or bread, and other purposes. Furnaces are constructed in a great variety of ways, according to the different purposes to which they are applied. In constructing furnaces the following objects are kept in view: (1) To obtain the greatest quantity of heat from a given quantity of fuel. (2) To prevent the dissipation of the heat after it is produced. (3) To concentrate the heat and direct it as much as possible to the substances to be acted on. (4) To be able to regulate at pleasure the necessary degree of heat and have it wholly under the operator's management. An air furnace is one in which the flames are urged only by the natural draught; a blast furnace, one in which the heat is intensified by the injection of a strong current of air by artificial means; a reverberatory furnace, one in which the flames in passing to the chimney are thrown down by a low-arched roof on the objects which it is intended to expose to their action. See BLAST FURNACE.

FURNESS, HORACE HOWARD, an American Shakespeare scholar and editor; son of William H.; born in Philadelphia, Pa., Nov. 2, 1833; was graduated at Harvard in 1854; studied law, and was admitted to the bar in 1859. The honorary degree of Ph. D. was conferred on him by the University of Göttingen. He was the editor of the exhaustive "New Variorum Edition" (1871-1900), of Shakespeare. He died in 1912.

FURNESS, WILLIAM HENRY, an American clergyman and author; born in Boston, Mass., April 20, 1802. He was educated at Harvard; studied theology at Cambridge, Mass., and was pastor of the First Unitarian Church in Philadelphia in 1825-1875. Among his numerous works are: "Remarks on the Four Gospels" (1836); "Jesus and His Biographers" (1838); "The Story of the Resurrection Told Once More" (1885); "Verses and Translations from the German Poets" (1886); "Pastoral Offices" (1893). He died in Philadelphia, Pa., Jan. 30, 1896.

FURNISS, HARRY, an English artist. He was born in Wexford, in 1854, and settled in London at nineteen. He contributed for many years to the "Illustrated London News," "Graphic," "Black and White," "Illustrated Sporting and Dramatic News," and other magazines in England and America. He joined the staff of "Punch" in 1880, and has since toured the United States, Canada, Australia, etc., as a humorous lecturer. His works include: "Romps, Flying Visits"; "Royal Academy Antics"; "Humours of Parliament"; "America in a Hurry"; "P. and O. Sketches"; "Confessions of a Caricaturist"; "Harry Furniss at Home"; "Poverty Bay" (novel); "How to Draw in Pen and Ink"; "Friends Without Faces"; "Our Lady Cinema"; "Peace in War."

FURNIVALL, FREDERICK JAMES, an English historian of literature; born in Egham, Surrey, England, Feb. 4, 1825. A lawyer by profession, he became a socialist and reformer, and a student of debatable literary problems. His labors resulted in the production of "Shakespeare's England" (1877), and many editions of old masterpieces, such as: "Saint-Graal, the History of the Holy Graal in English Verse, by Henry Lonelich," and "Caxton's Book of Curtesye." He died July 2, 1910.

FURROW, in ordinary language, a trench in the earth made by a plow; any narrow trench, groove, or hollow; a wrinkle. In milling, the grooves in the face of a millstone; the plane surface is land. A leader furrow extends from the eye to the skirt of the stone at such draft as may be determined. The steep edge of the furrow is called the track edge; the more inclined edge is called the feather edge. The second furrow is that

branching from the leader nearest to the eye. The skirt furrow departs from the leader nearer to the skirt. A gauge furrow is concave at bottom.

FURS. Under the name of furs may be included the skins of almost all those animals which, for the sake of protection against cold, have for a covering an under layer of a soft, woolly, or downy texture, through which grows in most instances an upper one of a more bristly or hairy nature; some by nature possess more of the under coat, and others more of the upper, the proportion varying considerably in different animals and countries. In winter the fur becomes thicker in its growth, thereby improving the quality and value for commercial purposes; young animals too possess thicker coats than full-grown ones. In some instances the under-fur alone is used in manufacturing, while the upper hairs are removed—*e. g.*, in the fur-seal.

The chief supply of furs is obtained from Siberia and the N. parts of North America, and, as these tracts are for the greater part of the year frostbound, the fur-bearing animals enjoy a comparatively unmolested life; the fur, therefore, grows thickly during the winter season, and is in its best condition when the animal is trapped in the spring; large quantities also of the smaller sorts are found in the United States; Europe produces immense numbers of common furs, such as rabbits, hares, foxes, etc., besides the more valuable stone and baum (tree) martens, though the larger animals have almost disappeared as the countries have become more and more cleared and inhabited; South America yields nutrias and chinchillas; while Australia exports rabbits, opossums, and kangaroos, and Africa monkey and leopard skins. Nearly all fur-skins are brought to the market in the raw or undressed state.

FUSAROLE, or **FUSAROL**, in architecture, a molding or ornament placed immediately under the echinus in the Doric, Ionic, and Composite capitals; the shaft of a column, pilaster, or pillar, or that part comprehended between the shaft and the capital.

FUSE (a shortened form of fusee), a tube or casing filled with combustible material, and used for igniting a charge in a mine or a hollow projectile. The invention was undoubtedly contemporaneous with that of hollow projectiles. The following are the principal varieties of fuses in use:

(1) *Bickford fuse*, used for mining and submarine purposes. It consists of a small linen tube filled with gunpowder, the whole being covered with pitch. It burns at the rate of one yard in 70 seconds.

(2) *Blasting fuse*, used in mining and quarrying. It is filled with a slow-burning composition, allowing time for the operatives to reach a place of safety before it burns down to the charge. It is also used for submarine blasting.

(3) *Combination fuse*, for hollow projectiles, comprises a time-fuse and a percussion or concussion fuse united in the same case. The former is designed to explode the charge in case the latter fails to act on striking. Another form is that in which the time-fuse explodes the percussion-fuse. The variety is used with such explosives as dynamite and gun cotton.

(4) *Concussion fuse*, for hollow projectiles; designed to explode the charge when the shell strikes an object.

(5) *Delayed action fuse*, for use with common shell against earthworks. It causes the projectile to explode four seconds after impact.

(6) *Electric fuse* is one adapted to be ignited by the passage of an electric spark through it.

(7) *Percussion fuse*, embraces a capsule charged with fulminate, which is exploded by a plunger or its equivalent, when the projectile strikes. The plunger is held by a pin sufficiently strong to keep it in place in case of a fall, yet weak enough to be severed by the shock of striking.

(8) *Safety fuse* is a cord or ribbon-shaped fuse filled with a fulminating or quick-burning composition, and sufficiently long to be ignited at a safe distance from the chamber where the charge is placed.

(9) *Tape fuse* is a safety fuse, so called from its shape.

(10) *Time-fuse* is one which is adapted either by cutting off a portion of its length or by the character of its composition to burn a certain definite time.

FUSEL OIL, an oily product formed during the fermentation of potatoes, corn, and the juice of grapes. This is separated in the rectification of the spirit, occurring in the last part of the distillate as an acrid, oily liquid, having a peculiar odor and burning taste; it is poisonous.

FUSION, in ordinary language, the act of fusing, melting, or rendering liquid by means of heat; or the state of being melted or liquefied by means of heat. In politics, the term is used of the union of opposing parties for a common end. If a ticket should contain the names of members of two political parties with a view of securing for that

ticket enough votes to defeat a nominee of a third party at an election, that would be called a "fusion ticket." In chemistry, every substance begins to fuse at a certain temperature, which is invariable for each of them if the pressure be constant. Whatever be the intensity of the source of heat, from the moment fusion commences the temperature of the body ceases to rise, and remains constant till the fusion is complete. Some bodies have a definite fusing or melting point, as mercury at—38.8°; ice. +0; butter, +33; phosphorus, +44; sulphur, + 114; tin, + 228; lead, +335; zinc, + 422; antimony, + 450; silver, + 1,000; gold, + 1,250; and iron, + 1,500. Some have no definite point of fusion, melting gradually. This is called vitreous fusion.

FUSISPORIUM, in botany, a genus of hyphomycetous fungi, forming first a mildew and next an extensive gelatinous stratum, with spindle-shaped spores. There are many British species. *Fusisporium atrovirens* is a destructive mildew on onions; *F. fœni* is found in orange-red patches many feet wide; and *F. griseum* is common on dead leaves.

FUSTIAN, a species of cotton cloth somewhat similar in manufacture to velvet, having, in addition to the warp and weft, a species of pile. When in the loom, this pile presents the appearance of a set of loops; but these are afterward cut in two and sheared down. The fustian, when polished and finished, presents an evenly-ribbed surface on the exterior. The best descriptions of this class of goods are those known as cotton-velvet and velveteen; but besides these there are moleskin, corduroy, and several other kinds. See WEAVING. In literature, a forced, bombastic style of writing.

FUSUS, in zoölogy a genus of *Gasteropoda*, family *Muricidæ*. Shell, fusiform; canal, long, straight; operculum, ovate curved; nucleus, apicol. Known recent species, 184; fossil, 320; these latter, perhaps from the Bath Oölite, or at least the Gault, to the Eocene. *Fusus* or *Chrysodomus antiquus* is the buckie and roaring buckie of Scotland. *F. colosseus* and *F. proboscidalis* are of large size.

FUTURE LIFE, a life to succeed this one; a life beyond the tomb.

Ethnic Faiths.—The belief in a future life is very widely spread. In its early form no distinction is drawn between the souls of men and brutes; for both another state of existence is reserved. In the lowest form of Animism, a figure of a deceased friend appearing to a survivor in a dream is supposed to be the actual soul of the person dead, whence faith in another state of existence becomes natural and easy. Two distinct forms of belief now diverge, the one leading in the direction of the transmigration of souls, the other maintaining the independent existence of the personal soul after the death of the body. Among the lower races, the moral element in the doctrine of a future life is almost wholly wanting.

Judaism.—There are but few allusions to a future life in the Old Testament. The most notable one is, "And many of them that sleep in the dust of the earth shall awake, some to everlasting life, and some to shame and everlasting contempt. And they that be wise shall shine as the brightness of the firmament; and they that turn many to righteousness as the stars forever and ever" (Dan. xii: 2, 3).

Christianity.—"Jesus Christ," says St. Paul, "hath abolished death, and hath brought life and immortality to light through the gospel" (II Tim. i: 10). The doctrine in this case is not merely that of the immortality of the soul, not transmigrated, but retaining its separate individuality (see IMMORTALITY); there is superadded to this the resurrection and transformation of the body (see RESURRECTION). The moral element in the doctrine of a future life is here all in all.

FYFFE, CHARLES ALAN, an English historian; born in Blackheath, Kent, England, in December, 1845; was graduated at Oxford in 1868; and was called to the bar in 1876, but never practiced. As correspondent of the "Daily News" during the Franco-Prussian War he is said to have sent to that journal the first account of the battle of Sedan that appeared in print. On account of a false charge, he committed suicide. His historical works include "History of Greece" (1875); "History Primers"; and the well-known "History of Modern Europe" (1880, 1886, 1890). He died Feb. 19, 1892.

FYZABAD, or **FAIZABAD**, a city in the United Provinces of India, the capital of the division of the same name. Within its limits are many temples and a vast number of ruins of the ancient city of Ayodhya. The great fair annually held here is attended by over half a million pilgrims. There is an important trade in wheat and rice. The city contains large sugar refineries. It is the headquarters of a British commissioner. Pop. about 60,000.

G

G, g, the seventh letter and fifth consonant of the English alphabet, formed by arching the tongue against the hinder part of the roof of the mouth, then lowering the tongue and giving utterance to voice. G has two sounds in the English, one hard when it occurs before a, o, u, as in gate, god, gun (except in gaol), and when initial, always before e and i in all words of English origin, as in get, give, and when final, as in bag; also before the consonants l and r, as in glove, grove; the second sound of g is soft, and is a palatal sound like j. This second sound of g was unknown in Anglo-Saxon. It is the voiced sound corresponding to the breathed sound of ch as in church. It is the sound which g has commonly before e, i, and y, as in gem, gin, gymnastics. G is silent before n, as in gnat, when at the beginning of a word, and at the end of a word it generally serves to lengthen the vowel, as in benign. In form G is a modification of C, which in the Roman alphabet had the same power. The Anglo-Saxon g is in many words now represented by y, as in may (verb), way (Anglo-Saxon *wæga*), or w, as in law (Anglo-Saxon *lagu*), dawn (Anglo-Saxon *dagian*). Sometimes it has been softened down to a, e, or i, as in alike (Anglo-Saxon *gelic*), enough (Anglo-Saxon *genoh*), handiwork (Anglo-Saxon *handgeweorc*). Sometimes it is lost in the root, and makes its appearance in the derivative as in dry and drought, slay and slaughter, etc. From some words it has disappeared altogether, as in if (Anglo-Saxon *gif*), icicle (Anglo-Saxon *isgicel*), etc. It has been softened to ge (=j), as in cringe (Anglo-Saxon *cringan*), and to ch in orchard (Anglo-Saxon *ortgeard*). In Romance words g often disappears, as in master (Lat. *magister*). It has crept into some words (generally false analogy), as in sovereign, foreign, (Old French *soverain, forain*). Ec, eg has often become ge (=j), as in edge (Anglo-Saxon *ecg, egg*). Gh has a guttural sound, as in lough, the sound of f, as in tough, and in many words is not sounded, as in bright, plough.

G, as a symbol is used:

1. In numerals, for 400, and with a dash over it, for 40,000.

2. In music:

(1) The note lichanos in Greek music.

(2) The first note of the Church mode, called Eolin, the highest in pitch of the authentic modes.

(3) The lowest note of the grave hexachord; in the Guidonian system, *gamma ut.*

(4) The fifth note of the normal scale of C, called sol.

(5) The lowest or fourth string of a violin, the third of the viola and violoncello.

(6) The key-note of the major scale, having one sharp in the signature.

(7) The letter-name of the treble clef.

3. In Church calendar, for the seventh of the Dominical letters.

4. Physics: A symbol for the acceleration of a body falling in vacuo. It=980 C. G. S. units of acceleration.

GABLONZ (gä'blōnts), a town of the N. of Bohemia, 6 miles S. E. of Reichenberg, celebrated for its glass manufactures, in which thousands of men are employed. The town has also textile industries, bookbinding, and porcelain painting. Pop. about 30,000.

GABOON, or **GABUN**, a French colony on the W. coast of Africa on an estuary of the Gaboon river, 40 miles long by 10 miles, just north of the equator. The climate on the coastal strip is extremely unhealthy. On the inland plateau (2,600 feet above sea-level) it is better. Among the exports figure timber, gum, ivory, gutta-percha, palm oil and kernels, earth nuts, sesamum, and malachite; other products are brown hematite, quicksilver, sugar cane, cotton and bananas. The people belong for the most part to tribes of the Bantu stock, the more important being the Mpongwe, the Fans, Bakele, Bateke, etc. Sheep and goats are numer-

ous, but the former yield no wool. This part of Africa was discovered by the Spaniards in the 15th century. The French made their first settlement on the Gaboon estuary in 1842; 20 years later they extended their sway to the Ogowé. But they seem never to have attached any importance to the colony till after Savorgnan de Brazza began to explore it in 1876-1886. See FRENCH EQUATORIAL AFRICA.

GABORIAU, ÉMILE (ga-bō-ryō′), a French writer of detective stories; born in Saujon, Charente-Inférieure, France, Nov. 9, 1835. His early years were a succession of vicissitudes; the army, the law, and even the Church, were in turn the objects of his inconstant attentions till at last he wrote the highly successful romance, "The Lerouge Affair" in 1866. His works include: "File No. 113" (1867); "The Crime of Orcival" (1867); "Monsieur Lecoq" (1869); "The Fall" (1871); "The Rope About the Neck" (1873); etc. He died in Paris, Sept. 28, 1873.

GABRIEL CHANNEL, a strait of Tierra del Fuego, between Dawson Island and the mainland. This remarkable channel is about 2½ miles wide at either end, but the shores approach toward the middle, and rise to an almost perpendicular height of 1,500 feet. Lat. 54° 20′ S.; lon. 70° 40′ W.

GABRILOVITCH, OSSIP, a Russian pianist and composer. Born in St. Petersburg, Russia, in 1878, he studied at the conservatory there under the famous Rubinstein. Later he studied in Vienna, and in 1896 made his début in Berlin. After this he toured the Continent, and four years later came to the United States. His reception was most cordial both on this and on his numerous subsequent tours. In 1909 he married Mark Twain's daughter, Clara Clemens.

GAD, the seventh son of Jacob by Zilpah, the handmaid of Leah, and founder of an Israelitish tribe numbering at the exodus from Egypt over 40,000 fighting men. Nomadic by nature, and possessing large herds of cattle, they preferred to remain on the E. side of Jordan. Their territory lay to the N. of that of Reuben, and comprised the mountainous district known as Gilead, through which flowed the brook Jabbock, touching the Sea of Galilee at its N. extremity, and reaching as far E. as Rabbath-Ammon.

GADAMES, or GHADAMES (gä-dä′mes) (the Cydamus of the Romans), the name of an oasis and town of Africa, situated on the N. border of the Sahara, in lat. 30° 9′ N. and lon. 9° 17′ E. The entire oasis is surrounded by a wall, which protects it from the sands of the desert. The gardens of Gadames, which grow dates, figs, and apricots, owe their fertility to a hot spring (89° F.), from which the town had its origin. The town is a center for ivory, beeswax, hides, ostrich feathers, gold, etc., from the interior to Tripoli. Pop. about 7,500.

GADARA (gad′a-rä), formerly a flourishing town of Syria, in the Decapolis, a few miles S. E. of the Sea of Galilee, but now a group of ruins. It was the capital of Peræa. It endured sieges by Alexander Jannæus and Vespasian, but fell into decay after the Mohammedan conquest.

GADIDÆ (gad′i-dē), in ichthyology, cods; a family of fishes, sub-order *Anacanthina* (spineless fishes), tribe or group *Subbrachiata*, with ventral fins attached to the breast or throat. The body is rather long, a little compressed, and covered with small, soft scales; the teeth are in several rows. They are voracious fishes. They are found chiefly in the seas of temperate climates, and are largely used for the food of man. Species described by Yarrel, 21. See COD.

GADOR (gä-dor′), **SIERRA DE**, a mountain chain of Spain, in Andalusia, ranging nearly parallel with the Sierra Nevada. Its highest point is nearly 7,000 feet above sea-level.

GADSDEN, a city of Alabama, the county-seat of Etowah co. It is on the Coosa river, and on the Chattanooga Southern, the Louisville and Nashville, the Southern, and the Nashville, Chattanooga and St. Louis railroads. It is the center of an important timber and mineral region, and its industries include steel mills, lumber mills, blast furnaces, foundries and machine shops, car works, and manufactures of doors, blinds, flour, wagons, etc. Among the public buildings are a handsome post office and excellent school buildings. Pop. (1910) 10,557; (1920) 14,737.

GADSDEN, JAMES, an American diplomatist; born in Charleston, S. C., May 15, 1788; was graduated at Yale College in 1806; served with distinction in the War of 1812; and afterward took part in the campaign against the Seminole Indians. He was appointed minister to Mexico in 1853, and on Dec. 30 of that year negotiated the GADSDEN PURCHASE (*q. v.*), which fixed a new boundary between Mexico and the United States. He died in Charleston, S. C., Dec. 25, 1858.

GADSDEN PURCHASE, a treaty negotiated Dec. 30, 1853, by James Gads-

den, by which a tract of 45,000 square miles, now included in the S. part of Arizona and New Mexico, was purchased by the United States from Mexico for the sum of $10,000,000.

GADSHILL, a hill 3 miles N. W. of the Rochester, England, on the road to Gravesend. It is commemorated in Shakespeare's play, "Henry IV.," as the place where Falstaff had his encounter with the robbers and an inn at the place is called Falstaff's Inn. It is interesting in modern times for Gadshill Place, opposite the hill, which was long the residence of Charles Dickens and was the home in which he died.

GAELIC, or ERSE, LANGUAGE AND LITERATURE. The language spoken by the Highlanders of Scotland is termed by them the Gaelic; but the name frequently given to it by the Lowlanders is Erse, or Ersh, evidently a corruption of Irish. It is a dialect of that great branch of the Celtic languages termed the Gwyddelian or Gaelic, and to which belong also the Irish and Manx, or that spoken in the Isle of Man. According to Dr. Prichard, the Celts are of Eastern origin, belonging to the great Indo-European family. They arrived before the Teutons from the regions on the Oxus, and from Media, and penetrated through the Allophylic races along the S. shores of the Baltic Sea, at a time of which we have no historic data. At the time of the Roman invasion, Celtic was the language generally spoken in western Europe. The dialects of the Celtic still spoken, besides the three already mentioned, are the Welsh, and the language of Brittany; while the Cornish, another dialect, though not now spoken, is preserved in books. The three dialects, the Irish, the Scottish-Gaelic, and the Manx, approach each other so nearly as to constitute but one language, the peculiarities which distinguish them from each other not being sufficiently broad or vital to constitute either of them a distinct language. There are also marked differences in the language as spoken in different parts of the Highlands; and a native of Sutherland has some difficulty in understanding one. The Gaelic which, from a variety of cases has retained, in a considerable degree, its original purity, is copious, bold, and expressive. Having affixes and prefixes, it greatly resembles the Hebrew, particularly in the inflections of its nouns and verbs. In Ireland, the Gaelic spoken in the different parts varies.

GAELIC LEAGUE. An organization having for its object the preservation, cultivation and extension of the Irish language and Irish literature, and the reorganization of life in Ireland on the basis of the old Irish civilization. The Norman French who entered Ireland from England from 1169 onward speedily fell into Irish customs, learned to speak Irish in place of French, and became in the old phrase more Irish than the Irish. Two centuries later, however, when French among the educated classes in England began to give way to English, the English Government enacted laws, such as the Statute of Kilkenny of 1367, prohibiting the use of the Irish language, dress and family names in Ireland. At that time, however, English power in Ireland was confined to three or four counties in Leinster and even this restricted area was continually dwindling. Following the Reformation, however, and the Tudor wars, immense effort was put forth by the English Government to conquer Ireland and destroy its language and literature, and this effort found its culmination in the National Schools of 1833, in which English was introduced as the medium of instruction. Various efforts were made to preserve the national language, but without much avail till, in 1893, the Gaelic League was organized. Branches of the league spread quickly through not only Ireland, but other countries, and side by side with the cultivation of the language there was a revival of Irish art, industry, and sport. Chairs in Irish were established at Harvard, Columbia, and the Catholic University, as they had long been established in numerous continental universities. The movement spread to Scotland and the Isle of Man where the language still persisted from the period of Irish colonization in the early centuries of the Christian era. At the present time the language shows great vigor in Ireland and the output of books in Irish is almost equal to that in English.

GAETA (gä-ā'tä), a fortified seaport town of southern Italy, province of Caserta, at the end of a peninsula, on the W. shore of the kingdom, forming the N. W. boundary of the gulf to which it gives its name; 4 miles S. S. W. of Mola di Gaeta, 41 N. W. of Naples, and 72 S. E. of Rome. The town is regarded as one of the keys of southern Italy. Its port, though not the largest, is one of the safest and best in Italy. It is the center of a considerable trade. The place is very ancient. Cicero was put to death, by order of Antony, in its immediate vicinity. After the fall of the Western empire it had a republican form of government. In 1435 it was taken by Alfonso V. of Aragon; and since then be-

longed to the crown of Naples till 1860. In modern times it has been repeatedly besieged; the last siege of note was in 1806, when it fell into the hands of the French. In November, 1860, it withstood a siege of several weeks (as the last stronghold of Francis II., King of Naples, who had sought refuge within its walls) by the national troops commanded by General Cialdini. Pop. about 6,000.

GÆTULIA (jē-tū'li-ä), an ancient country of Africa situated S. of Mauritania and Numidia, and embracing the W. part of the Sahara. Its inhabitants belonged in all probability to the aboriginal Berber family of north and northwestern Africa; they were not in general black, though a portion of them dwelling in the extreme S., toward the Niger, had approximated to this color through intermixture with the natives and from climatic causes, and were called Melanogætuli, or "Black Gætulians." The Gætulians were savage and war-like, and paid great attention to the rearing of horses. They first came into collision with the Romans during the Jugurthine war, when they served as light horse in the army of the Numidian king. Cossus Lentulus broke them to Roman rule, obtaining for his success a triumph and the surname of Gætulicus (A. D. 6). The ancient Gætulians are believed to be represented by the modern Tuareg.

GAGE, LYMAN JUDSON, an American financier; born in De Ruyter, N. Y., June 28, 1836; removed to Rome, N. Y., in 1848, and was educated at the Rome Academy. He worked in the Oneida Central Bank from 1853 to 1855, when he went to Chicago and was employed by a planing-mill company. In 1868 he became cashier and in 1891 president of the First National Bank of Chicago. He was the first president of the Board of Directors of the World's Columbian Exposition, and several times president of the American Bankers' Association and the Civic Federation of Chicago. On March 5, 1897, he was appointed Secretary of the Treasury by President McKinley; in 1901 was reappointed; and at the end of that year resigned. He was the originator of the Civic Reform movement which started in Chicago and became national. In 1906 he retired from public life. He died in 1920.

GAGE, THOMAS, a British general; born in 1721. He fought with the British troops in America in 1755, 1758, and 1760; was commander-in-chief in North America, with headquarters at New York, in 1763-1772; was governor-in-chief and captain-general of province of Massachusetts Bay, with headquarters at Boston, in 1774; was again made commander-in-chief in North America in 1775, and returned to England the same year. He was promoted general in 1782. The battles of Lexington and Bunker Hill took place during his generalship. He died in April 2, 1787.

GAILLAC (gä-yäk'), a town in the French department of Tarn, on the river Gaillac, 32 miles by rail N. E. of Toulouse. The Abbey Church of St. Michel dates from the 12th century. The inhabitants are engaged in wine-growing, coopering, and spinning, and trade in clover, coriander seeds, plums and wine.

GAILLARD, DAVID DU BOSE, an American soldier and engineer. Born in 1859 in South Carolina, he graduated from the military academy at West Point in 1884. As a lieutenant he superintended harbor improvements at St. Augustine and Tampa, Florida. In the Spanish American War he served as a colonel and after the war closed he was chief engineer for the Santa Clara District in Cuba, having charge of the numerous public improvements carried on under the auspices of the Cuban and American Governments. After a period as a member of the staff of the War College at Washington he returned to Cuba as an important officer in the American Army of pacification in 1907. A member of the Isthmian Canal Commission in 1908, his whole time and attention were devoted for years to the problem of building an inter-oceanic canal. Many of the difficulties incident to the building of the Panama canal were surmounted by the aid of his genius. He died in 1913.

GAILOR, THOMAS FRANK, an American Protestant Episcopal bishop, born at Jackson, Miss., in 1856. He graduated from Racine College in 1876 and afterward studied at the General Theological Seminary. He was ordained priest in 1880. From 1879 to 1893 he was connected with the University of the South as professor of history and vice-chancellor. In the latter year he was appointed coadjutor bishop and succeeded to the bishopric in 1898. He was chancellor and president of the board of trustees of the University of the South from 1908. His writings include "Things New and Old" (1891); "Christianity and Education" (1903); "The Communion of Saints" (1908); "The Episcopal Church" (1914).

GAINES'S MILL, a locality near Richmond, Va., noted as being the scene of many balloon ascensions during the Civil War (1861-1865). Near here occurred the battle of Cold Harbor, called also

battle of Gaines's Mill, June 27, 1862, between a part of Lee's army and a part of McClellan's. Here, too, Lee repulsed Grant's assault, June 3, 1864.

GAINESVILLE, a city of Florida, the county-seat of Alachua county. It is on the Seaboard Air Line, the Atlantic Coast Line, and the Tampa and Jacksonville railroads. It is an important agricultural and stock-raising region and its industries include lumbering, phosphate mining, wagon works, planing mills, etc. It is the seat of the Florida State University and is a popular winter resort. Pop. (1910) 6,183; (1920) 6,860.

GAINESVILLE, a city of Georgia, the county-seat of Hall co. It is on the Southern, the Gainesville Northwestern, and the Gainesville Midland railroads. It has manufactures of cotton goods, cotton yarn, asbestos, cottonseed oil, wagons, brick works, etc. It is the seat of Brenau College and Conservatory of Music for young ladies. It also contains the Riverside Military Academy. Pop. (1910) 5,925; (1920) 6,272.

GAINESVILLE, a city of Texas, the county-seat of Cooke co. It is on the Trinity river and on the Gulf, Colorado, and Santa Fe, and the Missouri, Kansas, and Texas railroads. It is situated in an important agricultural and stock-raising region and its industries include iron foundries, machine shops, cottonseed oil works, flour mills, pressed brick works, etc. There are handsome public buildings, including a city hall, a city park, a library, etc. Pop. (1910) 7,624; (1920) 8,648.

GAINSBOROUGH, a market town of Lincolnshire, on the right bank of the Trent, 21 miles above its embouchure in the Humber, and 16 miles by rail N. W. of Lincoln. The parish church, with the exception of a fine old tower, dating from the 12th century, was rebuilt in 1736. The manor house, built by John of Gaunt, now forms part of the corn exchange. The grammar school was founded in 1589. The town manufactures linseed cake and oil, malt and cordage.

GAINSBOROUGH, THOMAS, an English portrait and landscape painter; born in Sudbury, Suffolk, England, in 1727. He was sent to London at the age of 14, to study art under Gravelot, Frank Hayman, and in the St. Martin's Lane Academy. Returning to his native county about 1744, he established himself as a portrait painter at Ipswich. He was patronized by Sir Philip Thicknesse, the governor of Landguard Fort. Through the advice of his friend, he removed in 1760 to Bath. Here he won the public by his portrait of Earl Nugent; numerous commissions followed, and in 1761 he began to exhibit with the Society of Artists of Great Britain, a body which he continued to support till 1768, when he became a foundation member of the Royal Academy. In 1774, after a deadly quarrel with Thicknesse, he removed to London, and there prosecuted his art with splendid success, being in portraiture the only worthy rival of Reynolds, and in landscape of Wilson, Gainsborough is excellently represented in the National Gallery, London, by 14 works, including portraits of "Mrs. Siddons," of "Orpin the Parish Clerk," and of "Ralph Schomberg, M. P.," and "The Market Cart," and "The Watering-Place"; in the National Portrait Gallery, London, by five works; in the Dulwich Gallery by six works, and in the National Gallery of Scotland by the portrait of the "Hon. Mrs. Graham." One of his most celebrated portraits is that of Master Jonathan Buttal, known as "The Blue Boy," in the collection of the Duke of Westminster. He died in London, Aug. 2, 1788.

GALAPAGOS (gä-lä'pä-gōs) Spanish, "tortoises," a group of 13 islands of volcanic origin in the North Pacific Ocean, about 600 miles W. of the coast of Ecuador, to which they belong; area, 2,950 square miles. The most important are Albemarle, 60 miles long by 15 broad, and rising 4,700 feet above the sea; Indefatigable, Chatham, Charles, James, and Narborough. Many of the fauna and flora of the islands are peculiar to them, the most remarkable being a large lizard and the elephant tortoise.

GALASHIELS (gal-a-shēlz'), the chief seat in Scotland of the Scoth tweed manufacture. It occupies 2½ miles of the valley of the Gala, immediately above the junction of that river with the Tweed, 33½ miles S. S. E. of Edinburgh, and 4 W. N. W. of Melrose. Its tower, demolished about 1814, was occupied in the 15th century by the Douglases. As early as 1581 wool was here manufactured into cloth. The town has also the largest skinnery in Scotland. Pop. about 13,000.

GALATIA, in ancient geography, a country of Asia Minor, lying S. of Paphlagonia, W. of Pontus, and N. E. of Phrygia. It was originally a part of Phrygia, but the Gauls or Celts, having invaded Asia in several bodies, conquered and settled in this country about B. C. 241, whence the name.

GALATIAN, a native, or inhabitant of Galatia. St. Paul's Epistle to the Galatians, a New Testament epistle, stated in ch. i: 1 to have been written by the Apostle Paul, a claim admitted by the

ancient Church universally, and by nearly all the ablest modern critics.

GALATINA (gä-lä-tē'nä), a town of Italy, 13 miles S. W. of Lecce. It has a church, erected in 1384, with antique sculptures and fine tombs of the Balzo-Orsini family. Pop. 12,500.

GALATZ (gä'läts), or **GALACZ** (gä'läch), a river port of Moldavia, the center of the commerce of Rumania, situated on the left bank of the Danube, 3 miles below the influx of the Sereth, and 85 from the Sulina mouth of the Danube, by rail 166 N. E. of Bucharest, and 259 S. W. of Odessa. It occupies the slope of a hill overlooking the river, and is divided into an Old and a New Town, the former consisting of irregularly built streets, the latter built more after the fashion of western Europe. Prior to the World War the chief objects of industry were iron, copper, wax candles, and soap. The exports consist of maize, wheat, wheat flour, barley, rye, and timber. Galatz has frequently been taken in the wars between the Russians and Turks since 1789. It ceased to be a free port in 1883. Pop. about 74,000.

GALA (gä'lä) **WATER**, a stream of Edinburgh, Selkirk, and Roxburgh shires, Scotland, rising among the Moorfoot Hills, and winding 21 miles S. S. E. past Stow and Galashiels, till, after a total descent of 800 feet, it falls into the Tweed, a little below Abbotsford, and 2½ miles W. of Melrose.

GALAXY, in astronomy, the Milky Way. It constitutes nearly a great circle inclined to the equinoctial at an angle of about 63°, and cutting that circle in right ascension 0h. 47′ and 12h. 47′, so that the N. and S. poles are situated, the one on right ascension 12h. 47′, declination N. 27°, and right ascension 0h. 47′, declination S. 27°. The milky appearance of the great belt or zone now described arises from the blended light of countless multitudes of stars, each doubtless a sun to some system of planets. Sir William Herschel estimated that at one portion of the Milky Way 116,000 stars passed through the field of the telescope in a quarter of an hour, and on another occasion 258,000 stars in 41 minutes. Here and there the Milky Way divides, especially at one spot, where there is a separation into two portions, somewhat resembling the projecting sides of a fish tail.

GALBA, SERVIUS SULPICIUS, a Roman emperor, successor of Nero; born Dec. 24, 3 B. C. He was made a prætor (A. D. 20), and afterward governor of Aquitania, and in A. D. 33 was raised to the consulship. Caligula appointed him general in Germany, and Claudius sent him in A. D. 45 as proconsul to Africa. He then lived in retirement till the middle of Nero's reign, when the emperor appointed him governor of Hispania Tarraconensis, but soon after ordered him to be secretly assassinated. Galba revolted; the death of Nero followed (A. D. 68), and he himself was chosen emperor by the prætorian cohorts in Rome. He went directly to Rome, but soon made himself unpopular by cruelty and avarice, and he was slain in the forum, Jan. 15, A. D. 69.

GALDÓS, BENITO PEREZ (gäl'dōs), See PEREZ GALDOS.

GALCHAS, a collective name given to a group of tribes inhabiting the highlands and upland valleys of Ferghana, Zarafshan and the Oxus. They are closely akin to the Iranic stock, and in speech are near the Tajiks and Persians.

GALE, NORMAN ROWLAND, an English poet born at Kew, Surrey, March 4, 1862. He graduated from Oxford in 1884. His most important works include: "A Country Muse" (1892); "Cricket Songs" (1894); "All Expenses Paid" (1895); "Songs for Little People" (1896); "Barty's Star" (1903). "A Book of Quatrains" (1909); "Song in September" (1912); "Collected Poems" (1914).

GALE, ZONA, an American writer, born at Portage, Wis., in 1874. She graduated from the University of Wisconsin in 1895, and until 1904 was engaged in newspaper work in Milwaukee and New York. She began contributing short stories to magazines and at once attained notice for her unusual skill in portraying life and character in rural communities. Her works include "Friendship Village" (1908); "Mothers to Men" (1911); "A Daughter of To-morrow" (1917); "Peace in Friendship Village" (1919); "Miss Lulu Bett" (1920).

GALEN, or **CLAUDIUS GALENUS**, a celebrated Greek physician; born in Pergamus, Mysia, in A. D. 131. In his 19th year he began the study of medicine, first at Pergamus, afterward at Smyrna, Corinth, and Alexandria. On his return to his native city in 158 he was appointed physician to the school of gladiators. Six years later he went to Rome and was offered, though he declined, the post of physician to the emperor. Scarcely, however, had he returned to his native city when summoned by the Emperors M. Aurelius and L. Verus to attend them in the Venetian territory, and shortly afterward he accompanied or followed them to Rome (170). There he remained

several years. He attended M. Aurelius and his two sons, Commodus and Sextus, and about the end of the 2d century was employed by the Emperor Severus. Galen was a voluminous writer not only on medical, but also on philosophical subjects, such as logic, ethics, and grammar. The works that are still extant under his name consist of 83 treatises that are acknowledged to be genuine; 19 whose genuineness has been questioned; 45 undoubtedly spurious; 19 fragments; and 15 commentaries on different works of Hippocrates. His most important anatomical and physiological works are: "Of Anatomical Administrations" and "Of the Use of the Parts of the Human Body." As an anatomist, he combined with patient skill and sober observation as a practical dissecter—of lower animals, not of the human body—accuracy of description and clearness of exposition as a writer. He is said to have died in Sicily, about A. D. 201.

GALENA (PbS), the sulphide of lead, found both in masses and crystallized in cubes, but sometimes in truncated octahedra; its color is bluish-gray, like lead, but brighter. For the most part it contains about 86.6 per cent. of lead and 13.4 of sulphur, generally some silver and also antimony, zinc, iron, and bismuth. Where the proportion of silver is high it is known as argentiferous galena, and worked with a view to the extraction of this metal. Galena occurs principally in the older or Primary rocks, being found in England mainly in the Mountain Limestone (base of the Carboniferous formation). In the United States it is very abundant, the deposit of galena in which the mines of Illinois are situated being the most extensive and important hitherto discovered.

GALENA, a city and county-seat of Jo Daviess co., Ill.; on the Galena river, near its junction with the Mississippi, and on the Illinois Central, the Chicago and Northwestern, and the Burlington and Chicago Great Western railroads; 165 miles W. of Chicago. It has steamer connections with all important river ports, and has numerous smelting, marble, and stone works, foundries, bridgeworks, machine shops, planing mills, and a large trade in farm and dairy products, and live stock. It is noted as an early residence of General Grant and received its name from the numerous lead mines in the vicinity. Among points of interest in the city are its public parks, Grant Park, United States Marine Hospital, Custom House, and the Grant Homestead. The city has an abundant water supply from artesian wells, fine natural drainage, public high school, daily and weekly papers, National banks. Pop. (1919) 4,835; (1920) 4,742.

GALERIUS (-lē'ri-us), or **GALERIUS VALERIUS MAXIMIANUS**, a Roman emperor; born of humble parentage, near Sardica, Dacia. Entering the imperial army, he rose rapidly to the highest ranks. In 292 Diocletian conferred on him the title of Cæsar, and gave him his daughter in marriage. In 296-297 he conducted a campaign against the Persians, in which he decisively defeated their king, Narses. On the abdication of Diocletian (305) he and Constantius Chlorus became joint rulers of the Roman empire, Galerius taking the E. half. When Constantius died in York (306) the troops in Britain and Gaul immediately transferred their allegiance to his son, Constantine (afterward Constantine the Great). Galerius, however, retained possession of the E. till his death. He died in A. D. 311.

GALESBURG, a city of Illinois, the county-seat of Knox co. It is on the Chicago, Burlington and Quincy and the Atchison, Topeka and Santa Fe railroads. It is an important industrial community and has the Burlington Railroad shops, stock yards, brick making plants, boiler and engine works, iron foundries, etc. It is the distributing point for the wholesale and jobbing trade of a large section. The city is notable for the number of its educational institutions within its borders. These include Knox College, Lombard College, Corpus Christi Lyceum, St. Mary's School, St. Joseph's Academy, and others. There are several excellent parks, hospitals, and a public library. Pop. (1910) 22,089; (1920) 23,834.

GALICIA, formerly a kingdom and afterward a province in Spain, bounded N. and W. by the Atlantic, S. by Portugal, and E. by Leon and Asturias, with an area of 11,340 square miles. It has been divided since 1833 into the minor provinces of Coruña, Lugo, Orense, and Pontevedra, whose joint population is about 2,100,000. The country is mountainous, being traversed by offsets of the Asturian chain, rising in their highest peaks to about 6,500 feet. The W. spurs, Capes Ortegal and Finisterre, project into the Atlantic. The numerous short but rapid rivers form small estuaries which afford secure havens and roads. The principal river is the Minho, which, with its feeder, the Sil, is navigable for small vessels on its lower course. Galicia is one of the most fruitful portions of Europe, and has a mild, nourishing climate. Mines of lead, tin, copper, and iron pyrites are worked. The inhabitants, called Gallegos, are a robust, vigorous,

industrious race. Great numbers of them annually visit central and southern Spain and Portugal, where they find employment as harvesters, water carriers, porters, etc. Chief exports, live cattle, preserved meat, eggs, minerals, fish, fruits and grain; imports, coal, oil, hides, spirits, sugar, and tobacco. The principal towns are Santiago di Compostella and the two strongly fortified seaports Coruña and Ferrol. Galicia was a kingdom under the Suevi from 411 to 585, and again from 1060 to 1071, at which date it was finally incorporated with Leon and Castile.

GALICIA, a former province of Austria, now a part of the Republic of Poland, bounded by Russia, Bukowina, Hungary, and Moravia; area, 30,307 square miles; pop., Polish in the W., Russniak in the E. The great physical features of the country are, in a manner determined by the Carpathians, which form a long and irregular curve on the S. and send out branches into Galicia. Farther to the N. the hills subside rapidly and finally merge into vast plains. It has several considerable rivers, those on the W. being affluents of the Vistula, those in the E. of the Danube and Dniester. The climate is severe, particularly in the S. where more than one of the Carpathian summits rise beyond the snow-line. The summers are very warm but comparatively short. The soil in general is fertile, and yields abundant crops of cereals, hemp, flax, tobacco, etc. The domestic animals include great numbers of horned cattle and a fine hardy breed of horses. Sheep are in general neglected; but goats, swine and poultry abound, and bee-keeping is practiced on a large scale. Bears and wolves are still found in the forests; and all the lesser kinds of game are in abundance. The minerals include marble, alabaster, copper, calamine, coal, iron, and rock salt. Only the last two are of much importance. Rock salt is particularly abundant. The most important mines have their central locality at Wieliczka. Manufactures have not made much progress. The spinning and weaving of flax and hemp prevail to a considerable extent on the confines of Silesia. Distilleries exist in every quarter. The Roman Catholics and the Greek Catholics are the chief religious bodies. The chief educational establishments are the University of Lemberg and that of Cracow. The principal towns are Lemberg, the capital, and Cracow.

After being the field of continuous strife between Russians, Poles, and Hungarians, Galicia continued a Polish dependency from 1382 till the first partition of Poland in 1772, when it was acquired by Austria. Galicia was one of the Cis-Leithan provinces of the Austrian empire, and was represented in the Reichsrath by 63 deputies, while the affairs peculiar to itself were deliberated and determined on by its own Landtag or Diet. Polish is the language of official intercourse and of higher educational institutions. Galicia suffered severely in the World War, and was successively invaded by Russian and Austrian armies. It was awarded to Poland by the Treaty of Versailles. The capital is Lemberg. Pop. about 8,500,000. See POLAND.

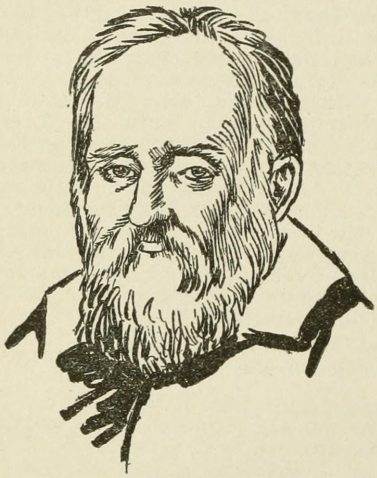
GALIGNANI, JOHN ANTHONY (gä-lē-nyä'-nē), an English journalist; born in London, England, Oct. 13, 1796; was taken by his father to Paris in the latter part of 1798. He succeeded his father in publishing the weekly paper "Galignani's Messenger," which had become popular among the English residents of Paris. He remained a subject of Great Britain during his life, and was very liberal to the charitable institutions of that country. He died in Paris, Dec. 31, 1873. His brother, WILLIAM, born in London, March 10, 1798, was associated with him in the management of the "Messenger," and in the building of a hospital in Neuilly for indigent English people. In his will he provided money and land for the erection in Neuilly of the Galignani Brothers' Retreat for 100 printers, booksellers, etc., or their families. He died in Paris, Dec. 12, 1882.

GALILEE, a Roman province, comprehending all the N. of Palestine W. of the Jordan. As the term Asia began with a small patch of territory in Asia Minor, but gradually had its meaning extended till it took in all the Asiatic continent, so the word Galilee was first applied to a fragment of the tribe of Naphtali, constituting its N. portion (Joshua xx: 7; II Kings xv: 29). It was mostly inhabited by Gentiles (Isaiah ix: 1; I Maccab. v: 20-23). In the New Testament times the word had the more extended meaning, and we learn from Josephus that there were an Upper and Lower Galilee. In architecture, a porch or chapel at the entrance of a church. In the galilee were formerly deposited corpses previous to interment, and religious processions were formed. The name is derived from the expression in the Bible, "Galilee of the Gentiles."

GALILEE, SEA OF, called also in the New Testament LAKE OF GENNESARET and SEA OF TIBERIAS, and in the old Testament SEA OF CHINNERETH or CINNEROTH, a large lake in the N. half of Palestine. Lying 626 feet below sea-level, it is 13 miles long by 6 broad, and 680 feet deep. It occupies the bottom of a

great basin, and is undoubtedly of volcanic origin. Its shores on the E. and N. sides are bare and rocky; on the W. sloping gradually, and luxuriantly covered with vegetation. The surrounding scenery is hardly beautiful, but its associations are the most sacred in the world.

GALILEI, GALILEO (gä-lē-lā'ē), commonly called Galileo (gal-i-lē'ō), a distinguished Italian physicist; born in Pisa, Italy, Feb. 18, 1564. His father, Vincenzo Galilei, a nobleman of Florence, intended him for the medical profession; but his love of mathematical studies was so decided that he was allowed to pursue them. At the age of 24 he was appointed mathematical professor at Pisa. There he was constantly engaged in asserting the laws of nature against the scholastic philosophy, which raised up



GALILEO

such a host of enemies against him that in 1592 he was obliged to resign his professorship. He then went to Padua, where he lectured with unparalleled success, and students flocked to hear him from all parts of Europe. After remaining there 18 years, Cosmo III. invited him back to Pisa, and then to Florence, with the title of principal mathematician and philosopher to the grand-duke. Galileo had heard of the invention of the telescope by Janson, and making one for himself. He found that the moon, like the earth, has an uneven surface, and he taught his scholars to measure the height of its mountains by their shadow. His most remarkable discoveries were Jupiter's satellites, Saturn's ring, the Sun's spots, and the starry nature of the Milky Way. The result of his discoveries was his decided conviction of the truth of the Copernican system; though the blind conservatism of the monks charged him with heresy for it, and he was twice prosecuted by the Inquisition, first in 1615, and again in 1633. On both occasions he was compelled to abjure the system of Copernicus. In the following year, when he was 70 years old, and his health was declining, a very heavy blow fell on him by the death of his beloved daughter, Maria. Two years later he became blind. His latter years were spent near Florence, devoting himself to the perfecting of his telescope. His greatest work is the "Dialogue on the Copernican and Ptolemaic Systems." Among his others are "Dialogues on Motion," "Sidereus Nuncius," "Treatise on the Sphere, etc." He died in Arcetri, near Florence, Italy, Jan. 8, 1642. His remains were ultimately deposited in the Church of Santa Croce at Florence.

GALION, a city of Ohio in Crawford co. It is on the Cleveland, Cincinnati, Chicago and St. Louis and the Erie railroads. Its manufacturing industries are of great importance. They include railroad shops, carriage factories, wagon works, lumber mills, manufactures of automobile gears, pipes, etc. The city has a public library. Pop. (1910) 7,214; (1920) 7,374.

GALITZIN (gä-lēt'sēn), **GALLITZIN, GALYZIN,** or **GOLYZIN** (gō-lēt'sēn), one of the most powerful and distinguished Russian families, whose members have been equally prominent in war and diplomacy from the 16th century downward. VASILI, surnamed the Great, born in 1643, was the councillor and favorite of Sophia, the sister of Peter the Great, and regent during his minority. His great aim was to bring Russia into contact with the W. of Europe, and to encourage the arts and sciences in Russia. His design to marry Sophia and plant himself on the Russian throne miscarried. Sophia was placed by her brother in a convent and Vasili banished (1689) to a spot on the Frozen Ocean, where in 1714 he died. AMALIE, PRINCESS GALITZIN (1746-1806), daughter of the Prussian general, Count von Schmettau. She was remarkable for her literary culture, her sympathetic relations with scholars and poets, but, above all, for her ardent piety. Having separated from her husband, she took up her residence in Münster, where she gathered round her a circle of learned companions, including Jacobi, Hemsterhuis, Hamann, and Count Stolberg. Prince DIMITRI ALEXEIEVITCH, a Russian diplomat and statesman; born Dec. 21, 1738; was ambassador to the court of France in 1763, and to The Hague in 1773. He was in correspondence with Voltaire and was the author of

several works relating to geology. He died in Brunswick, Germany, March 21, 1803. DIMITRI AUGUSTINE, son of the foregoing; born in The Hague, Dec. 22, 1770; became a Roman Catholic in his 17th year; was ordained a priest in the United States by Bishop Carroll of Baltimore in 1795; and betook himself to a bleak region among the Allegheny Mountains in Pennsylvania, where he was known as "Father Smith." Here he laid the foundation of a town called Loretto. He was for some years vicar-general of the diocese of Philadelphia. He wrote various controversial works, including a "Defense of Catholic Principles" (1816), "Letter to a Protestant Friend" (1820), and "Appeal to the Protestant Public" (1834). He died in Loretto, Pa., May 6, 1841.

GALL, a morbid excrescence on the leaf or leaf-bud of any plant, arising probably from the puncture of a cynips. These small hymenopterous insects deposit their eggs on the leaves, etc., of various plants, each species being limited to a single plant, or even a single part of one; thus there is a *Cynips ficus caricæ* on the common fig, a *C. fagi* on the beech, and a *C. quercus foli* on the leaves of the common oak. The so-called oak-apples are not fruits but morbid excrescences produced by *C. terminalis*, so called because it deposits its eggs at the extremity of the shoots of the tree. The galls of commerce are produced by the puncture by *C. gallæ tinctoria* of the leaf-bud of *Quercus infectoria*, or more rarely of some other species of oak. In the hole made by the insect, an egg is deposited, in due time to be developed into a larva, which eats its way out when it comes to the perfect state. One variety is white or yellow, another green, gray, or black. The best galls come from Smyrna and Aleppo. With the salts of iron they should yield a fine black color, and therefore are used in the manufacture of ink.

GALL, ST., an Irish monk of the 6th and 7th centuries; born in Ireland, about 550. He was educated at the monastery of Bangor, accompanied St. Columba to France about 585, and took part with him in all his missionary labors. Banished from France, they went together into the wilder regions of Switzerland, and near the Lake of Constance they founded the monastery which bore the name of St. Gall and gave name to the town and canton of St. Gall. After a few years Columba retired to Italy, leaving his companion abbot of the new house. The monastery was burnt by Hungarians in the 10th century. He died in St. Gall, Switzerland, about 645.

GALL, ST., a canton in the E. part of Switzerland, occupying the 14th place in the Swiss Confederation. It has E. the Vorarlberg and Lichtenstein, from which it is separated by the Rhine, S. E. and S. the Grisons; W. the cantons Glarus, Schwyz, and Zurich, with its lake; and N. Thurgau and the Lake of Constance. Length, N. to S., about 40 miles; breadth varying from 11 to nearly 35 miles. Area, 779 square miles. Surface, greatly diversified. In the N. there is an inconsiderable portion of plain country; but the central and S. parts are almost wholly covered with Alpine ranges, the summits of some of which rise above the snow limits. Mt. Scheibe, at the S. W. extremity, is estimated to be 10,188 feet above sea-level. There are, however, several extensive and fertile valleys, as that of Toggenburg (watered by the Thur, 36 miles in length), those of the Rhine, and others noted for their wild and picturesque character. Next to the Rhine, the chief rivers are the Thur, Sitter, Serz, etc.; Wallensee is the principal lake. Extensive forests cover the S. portion of the canton. Soil, moderately fertile. Products, corn, maize, hemp, and flax, fruit, etc. Cattle and hog feeding is extensively carried on. Minerals, iron and coal. Mineral springs are numerous. St. Gall is one of the principal Swiss manufacturing cantons; its inhabitants are mostly employed in its manufactures of cotton fabrics, thread, linens, glass, wax, etc. Chief town St. Gall, the capital. Pop. 304,000.

GALL, ST., capital of the above canton, situated on the Steinach, in a narrow and elevated valley, 7 miles S. W. of the Lake of Constance. It possesses a famous Benedictine abbey, which became the asylum of learning during the Dark Ages, and was one of the most celebrated schools in Europe between the 8th and 10th centuries; it now serves as the cathedral of the diocese. St. Gall is one of the chief manufacturing towns in the confederation; it has extensive manufactures of muslin, is the center of the Swiss trade in that fabric, and of gold and silver embroidery, besides cotton fabrics and yarn. Pop. about 75,000.

GALLAS, a race of people inhabiting that part of Africa which lies to the S. and W. of Harar and S. of Shoa, between lat. 9° and 3° S. and lon. 34° and 44° E. The best authorities regard them as belonging to the Ethiopic branch of the Hamites, and their language as a descendant of the ancient Geez of Abyssinia. Individually they are of average stature, with strong, well-made limbs, skin of a light chocolate brown, hair

frizzled but not woolly. Though cruel in war they are of frank disposition and faithfully keep their promises and obligations. They are distinguished for their energy, both physical and mental, especially those tribes to the S. and S. W. which pursue pastoral avocations, notably the breeding of horses, asses, sheep, cattle, and camels, and those which live by hunting, especially the elephant. These same tribes are mostly still heathens, though Mohammedanism is rapidly making way among them. The more N. tribes who dwell about Harar profess a crass form of Christianity derived from Abyssinia, and for the most part practice agriculture, raising cotton, durra, sugar, and coffee. The total Galla population, who call themseves Argatta or Oromo, is estimated at about 6,000,000. Politically they are divided into a great number of separate tribes (Itu, Arussi, Nole, Jarsso, Ala, Ennia, Walamo, Borana, etc). Their inveterate century-long foes are the Somali on the N. E. and E., who have gradually driven back the Gallas from the shores of the Red Sea and the extremities of the Somali peninsula, regions which were occupied by them in the 16th century, just as on the other side the Abyssinians and Shoans have beaten them back S. The country they now inhabit is, generally speaking, a plateau that slopes S. E. to the Indian Ocean, and has a hilly, well-timbered surface. This region, with plenty of rains and running streams, and abundant vegetation, is well cultivated, and yields wheat, barley, beans, sorghum, sweet potatoes, flax, lentils, cotton and coffee.

GALLATIN, ALBERT (gal'a-tin), an American financier; born in Geneva, Switzerland, Jan. 29, 1761. He was graduated at the university there in 1779. In 1780 he went to the United States, and was for a time teacher of French in Harvard College. In 1786 he removed to Pennsylvania, became a member of the State Legislature, and in 1793 he was elected to the United States Senate, but was declared ineligible. From 1795 to 1801 he served in the House of Representatives, and from 1801 to 1813 he was Secretary of the Treasury. He took an important part in the negotiations for peace with England in 1814, and signed the treaty of Ghent. From 1815 to 1823 he was minister at Paris, and in 1826 he was sent to London as ambassador extraordinary. On his return in 1827 he settled in New York, and devoted much of his time to literature, being chiefly occupied in historical and ethnological researches. He was one of the founders and the first president of the Ethnological Society of America; and from 1843 to his death he was president of the New York Historical Society. His works include publications on finance, politics, and ethnology; among these last are "The Indian Tribes East of the Rocky Mountains, etc." (1836), and "Notes on the Semi-Civilized Nations of Mexico, Yucatan, and Central America" (1845). He died Aug. 12, 1849.

GALLAUDET, EDWARD MINER (gal-â-det'), an American educator; born in Hartford, Conn., Feb. 5, 1837, son of Thomas Hopkins Gallaudet; was graduated at Trinity College in 1856. He organized the Columbia Institute for the Deaf, Dumb and Blind in Washington, D. C., in 1857, and from it developed the Gallaudet College for the Deaf, in 1864, becoming its president. His publications include "Manual of International Law" (1879), and "Life of Thomas Hopkins Gallaudet" (1888). He died in 1917.

GALL BLADDER, a pear-shaped membranous sac, 3 or 4 inches long by 1½ inches broad, lodged obliquely in a fossa on the under surface of the right lobe of the liver. The neck, which is shaped like the letter S, bends downward and terminates in the cystic duct.

GALLE (gäl), or **POINT DE GALLE** (point de gäl), a fortified town and seaport of the S. W. extremity of the island of Ceylon, on a low rocky promontory of the same name. It has a good harbor, formed by a small bay. It has lost its former importance as a coaling and transhipping station for the great lines of steamers from Europe to Australia and China since the completion of the breakwater at Colombo. It is the capital of the S. province of Ceylon. Pop. about 40,000.

GALLEGO, JUAN NICASIO (gäl-yā'gō), a Spanish lyric poet; born in Zamora, Spain, Dec. 14, 1777. He studied law, philosophy, and theology, at Salamanca; but began a poetical career on becoming intimate with Valdes, Quintana, and Cienfuegos. His political activity resulted in his imprisonment in 1814, and banishment for a short time subsequently. His "The Second of May" and an elegy on the death of Queen Isabella (1818), have attained particular celebrity. He served in the Spanish Cortes for some years. He died in Madrid, Jan. 9, 1853.

GALLEGOS (gäl-yā'gōs), a river of Patagonia entering the Atlantic Ocean opposite the Falkland Islands; lat. 51° 33′ S., lon. 69° W. It is small but very rapid, and at its mouth or estuary the tide rises 46 feet.

GALLEON, a name given by the Spaniards to a very large kind of a vessel, with three masts and three or four decks, such as those used by them in their commerce with South America, to transport the precious metals. They were large clumsy, square-sterned vessels that could make only slow progress under the most favorable conditions.

GALLEY. (1) A low, flat-built vessel with one or more rows or banks of oars, said to have been invented by the Corinthians in 700 B. C. The biremes, triremes, quinqueremes, etc., were galleys having so many banks of oars—two, three, five, etc. The pentecontori had 50 oars in a single tier. (2) A clinker-built boat for ship's use, from 28 to 36 feet long, and with a beam equal to one-fifth of its length. It is light and sharp, carrying from 10 to 12 oars, and is used for speedy rowing on expeditions. It usually has six alternate oars rowed by a picked crew. (3) An open boat used on the Thames by English custom house officers, river police, and formerly by press gangs, etc. (4) The cook house on board ship, which is on deck, or in a forward part of the vessel. In distilling, a gallery furnace. In printing, an oblong tray which receives matter from the composing-stick, and on which it is arranged in a column or page. The galley sometimes has a groove to admit a false bottom, called a galley slice.

GALLFLY, or **GALLWASP**, names generally applied to any member of a large family (*Cynipidæ*) of hymenopterous insects, most of the females of which lay their eggs in plants and by the associated irritation produce galls. The insects are not unlike little wasps with straight, thread-like antennæ, laterally compressed abdomen, and long wings. The eggs are laid in the leaves, twigs, roots, etc., of plants, which the mothers pierce with their ovipositors. The irritation of the wound and of the intruded and rapidly developing eggs results in pathological excrescences or galls. Within these the larvæ feed and grow, and either eat their way out while still grubs or remain till the pupa stage is past and emerge as adolescent insects. While most produce true galls, some members of the family act like cuckoos and utilize galls already formed by other genera. Others again depart more widely from the general habit and deposit their ova in other insects. The genera *Cynips*, *Aphilotrix*, *Andricus*, *Neuroterus*, *Spathegaster*, *Biorhiza* all form galls on oaks; *Rhodites* is the cause of mossy excrescences on rose bushes. Among those which utilize already formed galls, *Synergus* and *Aulax* are important genera; while *Ibalia*, *Figites*, *Eucoila*, and the minute species of *Allotria* are in their youth parasitic on other insects, such as flies and plant-lice. Among the common gall wasps *Cynips quercusfolii* makes the cherry-galls of oak leaves; *C. tinctoria* produces the well-known ink-gall of the Levantine oak; *Rhodites rosæ* forms the curious and familiar Bedeguar on wild roses.

GALLICAN CHURCH, the distinctive title of the Roman Catholic Church in France. It is the Church of France, considered less in relation to geographical boundaries than in its constitution and principles of church government. The Christian faith was widely diffused in France or Gaul, even during the lifetime of the apostles; and it especially flourished among the descendants of the Greek colonies of the S., and in the numerous towns and cities on the Rhône and its confluent rivers. The Church of Gaul numbers several eminent names in the literature of the 3d, 4th, and 5th centuries. The works of Irenæus, Bishop of Lyons, are among the most important for the history of doctrine of all the early patristic remains; and in the following century Sulpicius Severus, Hilary of Poitiers, Hilary of Arles, Vincent of Lerins, Prosper, Victor, Eucherius, Salvian, and Gregory of Tours combine to form a body of literature of which the later modern representatives of the French Church are reasonably proud. The hierarchical organization also of the Church of Gaul was, at a very early period, among the most complete and regular throughout the churches of Western Christendom. The Gallican Church underwent very extensive modifications at the close of the 18th and the beginning of the 19th century, not merely by the enactment of what was called the "civil constitution of the clergy," and which introduced into the constitution of the Church a large infusion of the Presbyterian, and even the Congregational element, but by the concordat of Pius VII. with Bonaparte as First Consul, which reduced the number of sees, diminished the number of festivals, and confirmed the suppression of the ancient religious establishments, and confiscation of the church property. Under the Third Republic successive French Governments became more and more aggressive in their attitude toward the Church. This attitude eventually led to the suppression of the religious congregations, the confiscation of their property, and the repeal of the Concordat, absolutely separating Church and State. As a result of the World War, however,

and in appreciation of the work done by the French Roman Catholics, both clergy and laity, in behalf of France, more friendly relations between France and the Vatican were re-established.

GALLIENI, JOSEPH SIMON. French soldier. He was born at St. Béat, 1849, and after passing through the military academy of St. Cyr, fought as lieutenant in the Franco-German war, distinguishing himself in the defense portrayed in "La Dernière Cartouche" of Neuville. In 1880 he procured for France from the Sultan of Segou, though a captive, commercial privileges in Upper Nigeria. He was made a general for his later work in



GENERAL GALLIENI

Indo-China, and after 1896 became governor-general of Madagascar, deposing Queen Ranavalo. In 1908 he became a member of the Superior War Council. On the breaking out of the World War in 1914 Gallieni was made military governor of Paris, and his despatch of troops to the aid of General Manoury was instrumental in checking the Germans at the Marne. As a result, Gallieni was hailed as "savior of Paris." He continued his work as governor of the city for over 14 months, developing its defense, and rushing aid to threatened points in the front line. Toward the close of 1915 he became Minister of War, and was later intrusted with the development of the aviation arm, but a breakdown forced his retirement and he died at Versailles, May 27, 1916.

GALLIFET (gä-li-fā), **GASTON ALEXANDRE AUGUSTE, MARQUIS DE,** a French general; born in Paris, France, Jan. 23, 1830. He joined the army in April, 1848, and became colonel in December, 1867. He served in the Crimea, Mexico (severely wounded at Puebla, 1863), Algeria (1860-1868). He commanded the 3d Regiment of Chasseurs d'Afrique, took part with the Army of the Rhine during the Franco-German War, being made prisoner at Sedan, and was promoted to the rank of General of Brigade, Aug. 30, 1870. During the second siege of Paris he commanded a brigade of the Army of Versailles, and was distinguished for severity to the Communard prisoners. In 1872 he was sent to Africa and had a considerable share in the pacification of the unsubdued tribes. He took charge of the expedition on El-Goliah, executed a rapid march through a desert country and severely punished the revolted tribes (December, 1872-March, 1873). On the general reorganization of the army, the Marquis de Gallifet was named to the command of the 3d Brigade of Infantry of the 8th Army Corps, and of the subdivision of the department of the Cher. Promoted to the rank of General of Division, May 3, 1875, he obtained the command of the 1st Division of Cavalry, and in February, 1879, that of the 9th Regiment. He was decorated with the Legion of Honor in 1855, made officer in 1863, and commander in 1873; Member of the Council of War in 1885, and Minister of War in 1899. He died July 8, 1909.

GALLINGER, JACOB HAROLD, United States senator from New Hampshire, born in Cornwall, Ontario, in 1837. He received an academic education and studied medicine at the Medical Institute of Cincinnati. He engaged in practice in Concord, N. H., in 1862. In 1872 he was elected to the State House of Representatives and to the State Senate for three years succeeding. He was chairman of the Republican State Committee from 1882 to 1890, and again from 1898 to 1907. He was elected United States senator in 1891 and was successively re-elected until 1915. He was a member of many important committees, including those of Appropriation, Finance, etc. He was recognized as one of the leading members of the Senate. He died in 1918.

GALLINULINÆ (-lī'nē), in ornithology, water hens. A sub-family of *Rallidæ* (rails). They have the base of the ridge of the bill dilated into a soft oblong plate, occupying part of the forehead. They are aquatic birds, swimming and diving well, feeding on insects, worms, mollusca, besides seeds of grasses and other plants.

GALLIPOLI (gäl-lēp'ō-lē), a town of southern Italy, built on a steep insulated rock in the Gulf of Taranto, connected with the mainland by a bridge, and 59 miles by rail S. of Brindisi. The harbor is protected by a mole and fortified. The town contains a handsome cathedral and is remarkable for its oil tanks, excavated in the solid rock, in which olive oil is deposited for exportation. Pop. about 12,000.

GALLIPOLI, a seaport of Turkey, on the peninsula of the same name (the ancient Thracian Chersonesus), at the N. E. extremity of the Dardanelles, 90 miles S. of Adrianople, and 130 W. S. W. of Constantinople. The ancient Kallipolis, of which some ruins remain, it was formerly the most important commercial town on the Hellespont, and still retains considerable trade. There are two harbors, extensive bazaars, and some manufactures. Gallipoli is the headquarters of the Turkish fleet and the seat of a Greek bishop, and contains numerous mosques and fountains. The town was taken by the Turks in 1356, and formed their earliest European possession; and here the allies disembarked during the Crimean War. Pop. about 30,000. The northern portion of the peninsula was the scene of intense fighting in 1915. See WORLD WAR; TURKEY.

GALLIPOLI, PENINSULA OF, a tongue of land separating the Hellespont from the Ægean Sea and the Gulf of Saros, 62 miles long, by a varying breadth of from 4 to 12 miles. Lat. between 40° 3′ and 40° 38′ N., lon. between 26° 10′ and 27° E.

GALLIPOLIS, a city of Ohio, the county-seat of Gallia co. It is on the Ohio river, and on the Hocking Valley and the Kanawha and Michigan railroads. It is the center of important coal fields, the greater part of which have not been developed. Its industries include iron and wood working establishments, the manufacture of stoves, flour, ice, brooms, lumber, leather, etc. It is the seat of the Ohio Hospital for Epileptics, and has a public library, a park, and Gallia Academy. Pop. (1910) 5,560; (1920) 6,070.

GALLIUM, a metallic element, symbol Ga, atomic weight 69.9. Gallium is a triad element. Specific heat 0.079. It was discovered by a French chemist, Lecoq de Boisbaudram, in zinc blende. The metal is obtained by dissolving the blende in sulphuric acid and placing in the solution plates of zinc till the disengagement of hydrogen becomes slow, but is still perceptible, by which means the greater portion of the copper, lead, cadmium, iridium, thallium, silver, mercury, selenium, arsenic, etc., contained in the ore is precipitated; the clear filtered liquid is then heated with a large excess of zinc, the resulting gelatinous precipitate, consisting chiefly of alumina, basic salts of zinc, and gallium, is redissolved in hydrochloric acid, and again heated with zinc, which gives a precipitate in which the gallium is more concentrated. This precipitate is redissolved in hydrochloric acid, the solution is treated with hydrogen sulphide, and the filtered liquid, after expulsion of the H_2S, is fractionally precipitated with ammonium carbonate till the solution of the resulting precipitate in hydrochloric acid no longer gives any indication of the presence of gallium when examined by the spectroscope. The precipitates are collected and dissolved in sulphuric acid, and cautiously evaporated till the free sulphuric acid is expelled; the residue when cold is digested with water till it is dissolved, the nearly neutral solution is boiled, the basic gallium sulphate is precipitated and filtered while hot, and then dissolved in a small quantity of sulphuric acid, treated with excess of potash till the precipitate is redissolved and then precipitated by a stream of CO_2. Finally the gallium oxide is redissolved in the smallest quantity of sulphuric acid, the solution mixed with excess of slightly acid ammonium acetate, then H_2S gas is passed through the liquid; the filtered acetic solution is diluted with water, and heated to boiling, whereby the greater part of the gallium is precipitated as oxide; this precipitate is filtered off hot, washed with boiling water, and redissolved in sulphuric acid, and the solution mixed with a slight excess of potash, and filtered, whereby a pure alkaline solution of gallium is obtained. Metallic gallium is obtained by the electrolysis of this alkaline solution, platinum electrodes being used, and the positive electrode being larger than the negative on which the metallic gallium is precipitated, which is detached by dipping the platinum plate in warm water and bending it backward and forward. Gallium is a silver-white metal, which melts at 30°, but remains liquid for weeks at 0°. Cooled to 15° it crystallizes. Gallium is a hard metal, very slightly malleable, and leaves a bluish-gray trace on paper; when melted it adheres to glass; it does not tarnish in the air. Its specific gravity is 5.95. It gives a brilliant violet line in the spectrum.

GALLIWASP, a small lizard, family *Scincidæ*, found in the West Indies. It is an object of terror to the inhabitants, but is really harmless.

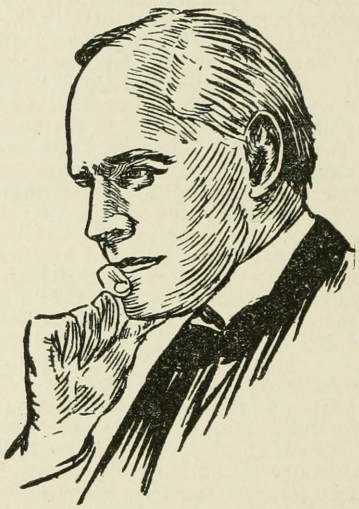
GALLOWAY, an extensive district in the S. W. of Scotland, once somewhat larger, but now entirely comprised in the shire of Wigtown and stewartry of Kirkcudbright. It enjoys a remarkably mild climate, and has long been famous as a pastoral country, its breed of small horses and of large hornless black cattle being well known centuries ago; dairy farming is now the most important industry. The province is about 70 miles in length, by 40 at its utmost breadth, and contains the greatest diversity of scenery—mountain, lake, and stream. There is no mineral wealth and hardly any industry, hence the inhabitants are almost entirely concerned with tilling the soil, sheep and cattle rearing, and fishing. The province owes its name to the fact that the natives were called Gall-Gael, or foreign Gaels, at first because of their falling under the foreign rule of the Anglians; but as the Picts of Galloway they continued to be known so late as the Battle of the Standard in 1138. Their geographical position had shut them off from their N. congeners, and they continued under their ancient name a distinct people till the 12th century, and preserved their language—which was substantially identical with Gaelic—till the 16th, when it finally disappeared before the Reformation and the use of Lowland Scotch in the parish churches and schools.

GALLOWS, an instrument or apparatus on which criminals are executed by hanging. It is usually constructed of two posts with a cross-beam on the top, from which the criminal is hanged by a rope passing round his neck. In agriculture, the central core of four Indian cornstalks, interlaced diagonally and bound at the intersection, forming a stool or support for cut corn, which is bound around it to form a shock. In printing, the rest for the tympan when open. Also the frame supporting the beam of a steam engine.

GALLUS, TREBONIANUS, a Roman emperor; the successor of the ill-fated Decius. He is memorable only for the dishonorable peace with the Goths, in permitting them to retain their plunder and captives and promising them a fixed annual tribute, and by a dreadful pestilence in Italy. He was murdered by his own soldiers in 253 or 254 A. D.

GALOPARO (gäl-ō-pärō), or **CAPO DI FARO** (kä'pō dē fä'rō), the Charybdis of the ancients. It forms the whirlpool on the outside of the harbor of Messina, in the strait separating Italy from Sicily. Opposite, on the Italian coast, is the rock Scylla.

GALSWORTHY, JOHN, an English writer. Born in 1867, his early writings excited but slight attention. It was not until he turned to modern social problems that his power as a dramatist and novelist was revealed. His novels deal with many phases of English life chiefly for the purpose of satire. Such for example is his first work that attracted attention, "The Island Pharisees" (1904, revised 1908) and later (1906) "The Man of Property." Likewise in his dramas he pays particular attention to the injustices of the present social scheme. "The Silver Box" (1906) is a



JOHN GALSWORTHY

drama with the theme of the different legal justice for the rich and poor. "Strife" (1909) is written to illustrate the war between capital and labor which features modern society. His most recent work is the drama entitled "The Mob" published in the year in which the World War opened.

GALT, a city of Ontario, Canada, in Waterloo co. It occupies both sides of the Grand river, and is on the Grand Trunk and the Canadian Pacific railroads. The river is spanned by several bridges. The city is important as an industrial center. The manufactured products include edged tools, underwear, agricultural implements, boilers, engines, leather, safes, stoves, etc. The city has four parks, a collegiate institute and a mechanics' institute. It is connected by electric railway with the neighboring towns of Kitchener, Paris, Waterloo, and Brantford. Pop. (1919) 12,434.

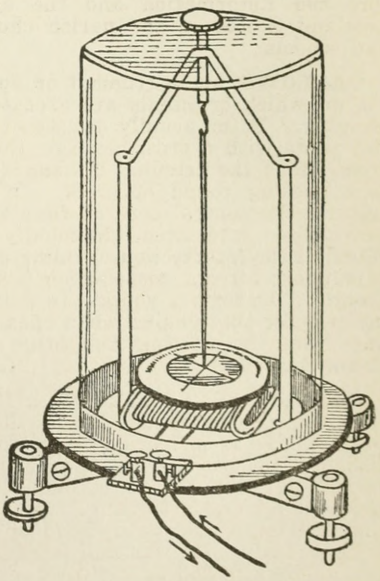
GALT, JOHN, a Scotch novelist; born in Irvine, Ayrshire, Scotland, May 2,

1779. He was educated in Greenock, and was then placed in the custom house. He remained there till 1804, when he went to London, with an epic poem on the battle of the Largs. After a few years his health began to fail, and he was obliged to seek relief in a more genial climate. At Gibraltar he made the acquaintance of Lord Byron and his friend Hobhouse, and the three travelers became fellow-voyagers; but soon after Galt separated from his new friends to visit Sicily, then Malta, and finally Greece, where he again renewed his acquaintance with Byron. On his return he published with considerable success "Letters from the Levant"; "The Ayrshire Legatees" (1820); "The Annals of the Parish" (1821), his masterpiece; "Sir Andrew Wylie" (1822); "The Provost" (1822); "The Entail" (1823). He was now busily engaged in the formation of the Canada Company. He went to Canada in 1826, but three years later returned to England a ruined man, and at once recommenced his literary labors. His first novel was "Lawrie Todd" (1830), which was followed by "Southennan," and a "Life of Lord Byron." In 1834 he published his "Literary Life and Miscellanies." He returned to Scotland, and died in Greenock, April 11, 1839.

GALTON, FRANCIS, an English scientist; grandson of Dr. Erasmus Darwin, and cousin of Charles Darwin; born at Birmingham, England, in 1822. He was educated at King Edward's School, Birmingham; studied medicine at the Birmingham Hospital and King's College, London; and graduated from Trinity College, Cambridge, in 1844. Having in 1846 traveled in north Africa, he explored in 1850 lands hitherto unknown in south Africa, publishing his experiences in his "Narrative of an Explorer in Tropical South Africa," which obtained the gold medal of the Royal Geographical Society, and in "Art of Travel," which passed through five editions between 1855 and 1872. His investigations in meteorology are recorded in "Meteorographica," published in 1863. A member of a Meteorological Committee of the Board of Trade, he was appointed one of the committee intrusted with the parliamentary grant for the Meteorological Office. Later he specially devoted himself to the problem of heredity, publishing "Hereditary Genius; Its Laws and Consequences" (1869); "Experiments in Pangenesis" (1871); "Natural Inheritance" (1889); "Finger Prints" (1893); "Fingerprint Directory" "Noteworthy Families" (1906), "Memoirs of My Life" (1908), "Essays in Eugenics" (1909). He was general secretary of the British Association in 1863-1868; president of the Anthropological Sections in 1877 and 1885; president of the Anthropological Institute in 1885-1886. He died in 1911.

GALVANI, LUIGI (gäl-vä'nē), an Italian anatomist; born in Bologna, Italy, Sept. 9, 1737. He studied theology and subsequently medicine at the university there, and in 1762 was elected Professor of Anatomy. Galvani owes the wide celebrity attached to his name to his discoveries in animal electricity. He published his "Commentary on the Electrical Forces in Muscular Motion" in 1791. Most of his writings were published in a quarto edition in 1841-1842 by the Academy of Sciences of his native city. He died in Bologna, Dec. 4, 1798. His statue was erected there in 1879.

GALVANISM, the branch of electric science to which an experiment by Galvani gave birth. His wife, who was making soup from frogs, happened to put them, after being skinned, in proximity to a charged electrical machine belonging to her husband. On touching them with a scalpel their legs became greatly convulsed. From this Galvani came to the erroneous conclusion that animal electricity existed in the nerves and muscles of



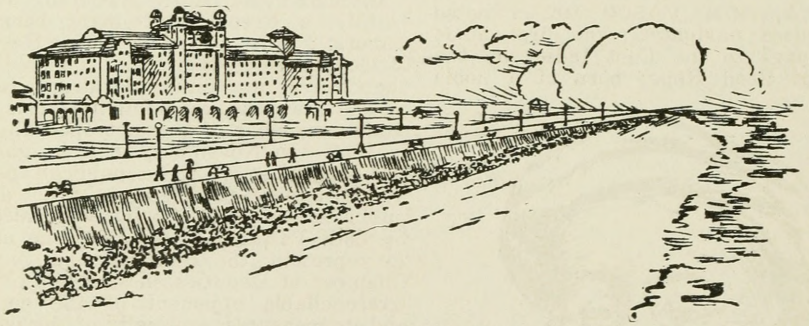
GALVANOMETER

frogs, etc. In this explanation Galvani ignored the metallic connecting wire. His contemporary, Volta, gave attention to this, and found that the contraction of the limbs is more energetic when the con-

necting arc is made of two metals instead of one. He therefore inferred that the metals took the active part in producing the contraction and the disengagement of electricity was due to their contact, and that the animal parts constituted only a conductor, and at the same time a very sensitive electroscope. In 1793 he published these views, and in 1800 first described and constructed what has since been called after him the voltaic pile. Now voltaic plates have nearly given place to voltaic or galvanic batteries, of which there are many varieties. See GALVANI, LUIGI.

GALVANOMETER, an instrument for detecting the presence and measuring the intensity of feeble galvanic currents.

A differential galvanometer is an instrument designed to ascertain a difference in the intensity of two galvanic currents. A marine galvanometer is a galvanometer designed to test the insulation of submarine cables, and at the same time unaffected by the pitching and rolling of the ship.



GALVESTON SEA WALL

GALVESTON, city and county-seat of Galveston co., Tex., on Galveston Island, between Galveston Bay and the Gulf of Mexico, and on the Gulf, Colorado and Santa Fe, the Missouri, Kansas and Texas, the International and Great Northern, and several other large railroads; and having steamship lines connecting with New York, New Orleans, Vera Cruz, Liverpool, and nearly all South American and West Indian ports. It has the largest and deepest harbor on the Gulf coast, with two miles of wharf front. Following the great flood of 1900 a great sea-wall covering the entire frontage of the city was constructed at a cost of $2,000,000. The harbor was also improved by the United States Government and was made accessible for the largest steamers.

Public Interests.—Galveston is the second largest city and the commercial metropolis of the State, and is regularly laid out, with wide streets and handsome buildings. The public buildings include the United States Government Building, County Court House, City Hall, Supreme Court House, Cotton Exchange, Masonic Temple, and several club houses. Among the more noted educational institutions are the University of St. Mary, Medical School of the University of Texas, Ursuline Convent, Convent of the Sacred Heart, Ball High School, and the Rosenberg School. The city has electric lights, and street railroads, waterworks, a public library, and several magnificent parks.

Business Interests.—The commerce of the city is very extensive. In the fiscal year 1920 exports were valued at $598,239,227, and imports at $16,287,637. In value of exports it was second only to New York. It is the first city in the United States in the export of cotton. The industries include cotton pressing, milling and manufacturing of cotton goods, bagging and cordage. In 1919 there were 2 National banks and several private banking institutions.

History.—Galveston was settled in 1837; captured by the Federal forces in 1862; and retaken by the Confederates in 1863. It was nearly destroyed by fire in 1885, and on Sept. 8, 1900, was visited by a violent tornado and flood, causing the loss of 7,000 lives and the destruction of property to the value of $20,000,000. Pop. (1910) 36,981; (1920) 44,255.

GALWAY, a municipal and parliamentary borough of Ireland, a seaport, and county of itself, at the mouth of the river Corrib, on the N. shore of Galway Bay, 50 miles N. N. W. of Limerick. The old town is poorly built and irregular. The new town consists of well-planned and spacious streets, and is built on a rising ground which slopes gradually toward the sea and the river. Galway is the see of a Catholic bishop, but is in

the Protestant Episcopal diocese of Tuam. The principal buildings are the cruciform church (Episcopal) of St. Nicholas (1320), St. Augustine's Catholic Church, Queens College, monasteries, nunneries, the county court house, barracks, etc. Galway has flour mills, extensive salmon and sea fishing, a good harbor, and a lighthouse. During 1858-1864 a line of steamers plied between Galway and the United States. The exports consist mainly of agricultural produce, wool, and black marble. It was taken by Richard de Burgh in 1232. From the 13th till the middle of the 17th century it continued to rise in commercial importance. In 1652 it was taken by Sir Charles Coote, after a blockade of several months; and in July, 1691, it was compelled to surrender to General Ginkell. Pop. about 16,000.

GALWAY BAY, a large bay on the W. coast of Ireland, between County Galway on the N. and County Clare on the S., about 20 miles in length and from 20 to 7 miles in breadth. Across its entrance lie the Aran Islands.

GAMA, DOM VASCO DA, a noted Portuguese navigator, who first made the voyage to the East Indies by the Cape of Good Hope; born of a noble



VASCO DA GAMA

family in Sines, Portugal, in 1450. The voyage had been projected under John II., and his successor, Emmanuel the Fortunate, having fitted out four vessels, intrusted Gama with the chief command. He sailed from Lisbon July 8, 1497, and doubling the Cape, visited Mozambique, Mombaza, Melinda, and Calicut, returning to Lisbon in 1499. For this exploit he was named Admiral of the Indies. In the year 1502 he was placed at the head of a powerful fleet, with which he provided for the security of future voyagers by founding establishments at Mozambique and Sofala. He established the first Portuguese factory in the Indies. He re-entered Lisbon in 1503 and passed the next 20 years in obscurity. In 1524 he was appointed Viceroy of India by King John III., but his administration lasted only three months. He died in Cochin, India, Dec. 24, 1524.

GAMALIEL, the name of two persons mentioned in Bible history, of whom the first, Gamaliel, the son of Pedahzur (Num. i: 10; ii: 20; vii: 54, 59; x: 23), was prince or head of the tribe of Manasseh. The other and better known Gamaliel is mentioned twice in the Acts of the Apostles, as a learned doctor of the law, of the sect of the Pharisees. From Acts xii: 3 we learn that he was the preceptor of St. Paul.

GAMBETTA, LÉON MICHEL (gon-be-tä'), a French statesman; born in Cahors, France, April 3, 1838. He was of Genoese extraction; was educated for the Church; and finally decided in favor of the law, and repairing to Paris became a member of the metropolitan bar in 1859. In November, 1868, he gained the leadership of the republican party by his defense of Delescluze, a noted republican. In 1869, having been elected by both Paris and Marseilles, he chose to represent the S. city; and in the Chamber of Deputies showed himself an irreconcilable opponent of the empire and its measures, especially of the policy which led to the war with Prussia. On the downfall of the empire, after the surrender of Sedan in 1870, a government for national defense was formed, in which Gambetta was nominated Minister of the Interior. The Germans having encircled Paris, he left that city in a balloon, and set up his headquarters at Tours, from which he for a short time organized a fierce but vain resistance against the invaders. After the close of the war he held office in several short-lived ministries, and in November, 1881, accepted the premiership. The sweeping changes proposed by him and his colleagues led to his resignation. The accidental discharge of a pistol caused his death near Sèvres, France, Dec. 31, 1882.

GAMBIA, a river of west Africa, rising in a mountainous district in Futa Jallon and flowing N. W. and W. to the Atlantic; length about 1,400 miles. It is navigable for 600 miles during seven

months of the year for vessels of 150 tons, but from June to November the river becomes a torrent.

The British Colony and Protectorate of GAMBIA occupies the banks of the river as far up as Georgetown; area, 69 square miles. It embraces St. Mary's Island, containing Bathurst, the chief town of the settlement. Besides the weaving of cotton into native cloths, there are manufactures of vegetable oils and bricks, and some boat-building. The staple product is the groundnut, which is exported to the S. of Europe for the extraction of oil. Other products are hides, rice, cotton, beeswax, kola nuts, and india-rubber. Formerly a dependency of Sierra Leone, the settlement was created an independent colony in 1843, and became a portion of the West African Settlements in 1876; in 1888 it was made a separate government. Pop. about 8,000. The protectorate has an area of 4,500 square miles; pop. about 200,000.

GAMBIER, GAMBIR (gam'ber), or **PALE CATECHU**, an important article of commerce, used to a small extent medicinally as an astringent but very largely in tanning and dyeing. It is an earthy-looking, light-brown substance, often in small cubes or in compact masses. It possesses no odor, but has a bitter, astringent taste, subsequently becoming sweetish. It is prepared from the young leaves of the *Uncaria Gambir*, a native of the countries bordering the Straits of Malacca. As the plant, which grows to 8 or 10 feet, constantly produces young leaves, the manufacture is carried on throughout the year.

GAMBIER ISLANDS, a group of small coral islands in the South Pacific, about lat. 23° 8′ S. and lon. 134° 55′ W.; belonging to France. The vegetation is luxuriant and there are numerous birds but no indigenous quadrupeds. A French mission station was formed on the largest island, Mangareva, in 1834.

GAMBIT, in chess, the sacrifice of a pawn in the beginning of the game in order to obtain a favorable position for attack.

GAMBLING, playing at games of hazard or chance for money. Strictly speaking, gambling may be understood as gaming in its worst sense, and as implying professional play for a money stake by men who are unscrupulous adepts at so-called games of chance.

GAMBOGE, or **CAMBOGE** (a corruption of Cambodia, the name of the district in Annam where it is found), a gum resin containing about 70 per cent. of resin, and 24 per cent. of soluble gum. It is obtained by piercing the bark of *Garcinia morella*, variety *pedicellata*, a tree belonging to the order *Guttiferæ*, growing in Cambodia, Siam, and the S. part of Cochin China. The juice is allowed to harden in bamboo reeds, hence it occurs in commerce in the form of pipes which are striated externally. Gamboge is hard and brittle, breaking with a yellow-brown vitreous conchoidal fracture; its powder is a bright yellow color; it is inodorous, has a slight taste, but when chewed is acid. Gamboge is used as a pigment in water-color painting. By the action of nitric acid it is oxidized into picric and oxalic acids. An inferior kind of gamboge in the form of flat cakes is prepared in Ceylon from *Hebradendron gambogioides*. In pharmacy, gamboge is used in the preparation of *Pilula cambogiæ compositæ*, compound gamboge pill, composed of gamboge, Barbados aloes, compound powder of cinnamon, hard soap, and syrup. Gamboge acts as a drastic hydragogue purgative, it causes vomiting and griping; it is seldom given alone, but combined with cream of tartar in cases of dropsy, or with calomel in cerebral diseases.

GAMBRINUS (-brī'nus), a mythical king of Flanders, to whom is ascribed the invention of beer. His figure is familiar in German beer-cellars, often seated astride a cask, a foaming tankard in his hand.

GAME, any contrivance, arrangement, or institution designed to afford recreation, sport or amusement; as, the game of baseball, or of football; in the plural contests in different sports, as wrestling, running, etc.

Public Games of Antiquity.—The public games of the Greeks were very numerous, and the origin of many of them is lost, on account of the religious mystery in which they were founded. Among the Grecian games, the most celebrated were the Olympic, the Pythian, the Nemean, and the Isthmian. The conquerors in the Olympic games were held in high respect, and were looked on as the noblest and happiest of men. These games were held every five years at Olympia, in Elis, on the W. side of the Peloponnesus. Among the exercises, some were designed to give strength, and others agility. The lighter exercises comprised running, leaping, throwing the quoit, and hurling the javelin. The more severe course of discipline included wrestling and boxing. Racing also constituted a particular feature in all the ancient games. The Isthmian games were held at Corinth, and, together with athletic exercises, horse and chariot races, constituted a large portion oi the

spectacle. Originally these games were connected with the worship of Neptune. The Persian war gave an impulse to the Isthmian games, while the Peloponnesian war dimmed their glory. Under the Romans, these games did not lose their importance, but were exhibited with increased celebrity. They were then held every three years, and comprised three leading divisions—musical, gymnastic, and equestrian contests. The prize at the Olympic games was merely a chaplet of wild olive. At the Isthmian games, the prize was parsley during the mythic periods; in later times, however, the victor was generally crowned with a wreath of pine leaves.

The amusements in the Roman circus did not differ materially from those which were celebrated in the games of ancient Greece. The theriomachia, or beast fight, was a favorite species of entertainment among them; and the men employed to fight with wild beasts, were called bestiarii. The combatants were divided into two classes—those who fought voluntarily for amusement or pay, and who were provided with weapons—and condemned persons, who were generally exposed to the fury of the animals naked, without arms, and sometimes bound. Under Pompey, no less than 600 lions were thus destroyed; and under Titus, 5,000 wild and 4,000 tame animals perished in a similar manner.

GAME LAWS, laws relating to the killing of certain wild animals pursued for sport, and called game. Formerly in Great Britain certain qualifications of rank or property were needed to constitute the right to kill game; but by the Game Act of William IV. the necessity for any qualification except the possession of a game certificate was abolished. Night poaching is a graver offense; any person found guilty of trespassing in pursuit of game between the first hour after sunset and the last before sunrise, is for the first offense liable to imprisonment with hard labor for three months and to find security for a year, a third offense involving liability to penal servitude. By an act of 1880 every occupier of land has a right, as inseparable from and incident to the occupation of the land, to kill and take ground game (hares and rabbits) thereon, concurrently with any other duly authorized person, all agreements in contravention of this right being declared void. Game laws of greater or less strictness are in force in many other countries. In Canada and the United States the chief restrictions are in regard to killing wild animals during the breeding season.

GANDAK (gun-dak′) (the Great Gandak; the Little Gandak being an unimportant tributary of the Gogra) a river of India, rising in the Nepal Himalayas, in lat. 30° 56′ N. and lon. 79° 7′ E., flowing S. W. to British territory, and then S. E., forming for some distance the boundary between the Northwest provinces and Bengal, and entering the Ganges opposite Patna.

GANDAMAK (gun-da-muk′), a village of Afghanistan, between Cabul and Peshawar, where, during the retreat from Kabul in 1842, the last remnant of the British force was massacred, only one man making his escape. Here also a treaty was signed with Yakub Khan in 1879. See AFGHANISTAN.

GANGES (gan′jēz), a river of Hindustan, one of the greatest rivers of Asia, rising in the Himalaya Mountains, in Garhwál state, and formed by the junction of two head streams, the Bhagirathi and the Alaknanda, which unite at Deoprag, 10 miles below Srinagar, 1,500 feet above sea-level. The Bhagirathi, as being a sacred stream, is usually considered the source of the Ganges, rising at the height of 13,800 feet, but the Alaknanda flows farther and brings a larger volume of water to the junction. At Hardwar, about 30 miles below Deoprag, the river fairly enters the great valley of Hindustan, and flows in a S. E. direction till it discharges itself by numerous mouths into the Bay of Bengal, after a course of about 1,500 miles. During its course it is joined by 11 large rivers, the chief being the Jumna, Son, Ramganga, Gumti, Gogra, Gandak and Kusi. In the rainy season the flat country of Bengal is overflowed to the extent of 100 miles in breadth, the water beginning to recede after the middle of August. The Ganges delta has the Hugli on the W., the Meghna on the E. and commences about 200 miles, or 300 by the course of the river, from the sea. Along the sea it forms an uninhabited swampy waste, called Sunderbunds, or Sundarbans, and the whole coast of the delta is a mass of shifting mud banks. The W. branch, the Hugli, is the only branch commonly navigated by ships. The Meghna, or main branch, on the E. is joined by a branch of the Brahmaputra. Some of the principal cities on the Ganges and its branches, ascending the stream, are Calcutta, Murshedabad, Bahar, Patna, Benares, Allahabad, Cawnpur, and Faruckabad. The Ganges is navigable for boats of a large size nearly 1,500 miles from its mouths, and it forms a great channel for traffic.

It is an imperative duty of the Hindus

to bathe in the Ganges, or at least to wash themselves with its waters, and to distribute alms, on certain days. The Hindus believe that whoever dies on its banks, and drinks of its waters before death, is exempted from the necessity of returning into this world and commencing a new life. The sick are therefore carried to the bank of the Ganges, and its water is a considerable article of commerce in the remoter parts of India.

GANGLION, in human anatomy, (1) a small mass of vascular neurine, situated in the course of a nerve, and distinct both from the brain and from the spinal cord. The sympathetic system of nerves consists of a series of ganglia, extending on each side of the vertebral column, from the head to the coccyx, connecting with all the other nerves of the body. Each ganglion is a distinct center, giving off branches in four directions, superior, inferior, external, and internal. They are divided into cranial ganglia, cervical, thoracic, etc., (2) a lymphatic gland. In comparative anatomy, a center of the nervous system, containing nerve cells, and receiving and giving out impressions. In surgery, a globular indolent tumor, situated on the course of a tendon. It is produced by the elevation of a sheath of the tendon and the infusion into it of a viscid fluid. In botany, the mycelium of certain fungals.

GANGRENE, a tendency to death or mortification, but stopping short of the complete process. It may affect an organ, such as the lung, but this is rare, or the soft tissues, which is common, particularly of the foot, especially in the aged, as senile gangrene. When part remains alive it is gangrene, when it is completely dead sphacelus. So in bone, caries and necrosis occur, the first as gangrene or incomplete, the second as sphacelus of complete death. Degeneration differs from gangrene in not becoming isolated or putrid, but, if not absorbed, remaining in continuity with surrounding parts. Gangrene of soft parts is usually termed sloughing. Necramia, or death of the blood, and sequestrum, or a dead piece of bone, are examples of gangrenous lesions.

GANGWAY, a passage or means of temporary access to a place or building, consisting of an inclined plane of planks; specifically, the opening in the bulwarks of a vessel by which persons come on board or disembark; also the temporary bridge affording means of passing from the ship to the shore, or vice versa. To bring to the gangway, to punish a sailor by seizing and flogging him. In the British House of Commons, a narrow passage running across the House and dividing the seats on each side into two parts. Above the gangway, that is, near the Speaker's end of the House, sit the Ministry and Opposition with their respective adherents, the former on the Speaker's right, the latter on his left. Below the gangway sit the neutral or independent members. In mining a main level, applied chiefly to coal mines.

GANHWEI (gän-hwā′e), or **ANHWEI** (än-hwā′ē), an E. inland province of China, intersected by the Yang-tse-Kiang.

GANNETT, HENRY, an American geographer; born in Bath, Me., Aug. 24, 1846; was graduated at the Lawrence Scientific School, in 1869; became geographer of the United States Geological Survey in 1882; was geographer of the 10th, 11th, and 12th censuses, and of those taken by the War Department in Cuba and Porto Rico in 1899. His publications include "Manual of Topographic Surveying"; "Statistical Atlases 10th and 11th Censuses"; "Dictionary of Altitudes"; "Commercial Geography"; etc. He died in 1914.

GANYMEDE (gan′i-mēd), in Greek mythology, the cup-bearer of Zeus. According to Homer, he was the son of King Tros and the nymph Callirrhoë; or, according to others, of Laomedon, Ilus, or Erichthonius. The most beautiful of mortals, he attracted the notice of the king of the gods, who determined to make him his cup-bearer in succession to Hebe, and accordingly dispatched his eagle to carry him off to heaven. At a later period he was identified with the divinity who presided over the sources of the Nile. The Greek astronomers likewise placed him among the stars, under the name of Aquarius ("the water-bearer") in allusion to his celestial function.

GANZ, RUDOLPH, a pianist and composer, born in Zurich, Switzerland, in 1877. He studied music in Switzerland and Germany and made his first appearance in Zurich at the age of 12. He later made extensive concert tours in Europe and in 1900 came to the United States. He taught music in Chicago from 1902 to 1905. In the latter year he abandoned teaching to undertake concert tours. He appeared with the leading orchestras and musical organizations throughout the United States and Canada. His musical works include a symphony, many piano pieces, and over 200 songs.

GAP (gäp), the mountain capital of the French department of Hautes Alpes;

on the Luye river; 2,424 feet above sea-level, among vine-clad slopes, 47 miles S. E. of Grenoble. It has a cathedral (rebuilt since 1866), and some manufactures of silk and cotton fabrics, and hats. The ancient Vapincum, it was formerly a fortress of some importance, and gave the title of Gapençois to the surrounding district of Dauphiné. Pop. about 11,000.

GARAYE (gă-rā′), **LA**, a ruined château in Brittany, 2 miles from Dinan. Its last owners, Claude Toussaint and his countess, in the first half of the 18th century converted it into a hospital.

GARBAGE, DISPOSAL OF. The question of the proper disposal of garbage and refuse has been one of the most important problems of municipal life. In the United States, the term garbage is used to designate kitchen waste of animal or vegetable origin, incident to the preparation and serving of food. Aside from household wastes, there are various classes of trade and manufacturing refuse, such as paper, rags, and shavings. It is the custom to keep organic and inorganic wastes in separate receptacles. Ashes are the chief inorganic substances, but no practical method has been found for their use, except as a filling. Garbage collection in large cities is undertaken by the city. A relatively small number of cities and towns have adopted thoroughly modern sanitary methods of garbage and refuse disposal.

The first garbage furnaces used to incinerate garbage, were installed in Great Britain. The first furnace in the United States built for a city was in Des Moines, Iowa, in 1887. Furnaces are of various types. Most of them are constructed upon English models.

The sorting of refuse has come to be highly specialized in some cities of the United States. The first city to install a well equipped refuse sorting plant was Boston. In sorting, the refuse is brought to a station, dumped and shoveled into an inclined conveyor from which are sorted the various grades of paper, rags, and other kinds of merchantable refuse. The remainder is dumped automatically into a furnace and burned. There are refuse sorting plants at Buffalo, Pittsburgh, New York, and other cities.

Garbage reduction is intended to recover grease and fertilizing material from animal and vegetable waste, while at the same time sanitary means are afforded for final disposal. The equipment required is somewhat elaborate, and includes tanks, dryers, grinding mills, and other apparatus. Many cities have municipal reduction plants. These include Cleveland, Ohio; Columbus, Ohio; Buffalo, N. Y.; New York City; and other cities.

Following the World War the utilization of garbage by feeding to hogs increased rapidly in the United States. The cities of Baltimore, Newark, Buffalo, and St. Louis changed from reduction to hog feeding, in 1919. In many other cities this method was used in disposing of garbage.

GARBOARD STRAKE, or **GARBOARD STREAK**, in shipbuilding, the range of planks nearest to the keel. In the merchant service, the rabbet to receive the garboard strake is made along the upper edge of the keel. In the navy, a groove is made half-way down the keel to receive the garboard strake.

GARCIA, CALIXTO (gär-thē′ä), a Cuban patriot; born in Holguin, Cuba, Oct. 14, 1836; and took up the profession of law. In 1868, with Donato del Marmol and Carlos Manuel Cespedes, he organized the revolution which has since been called the "Ten Years' War." Early in that struggle the Cubans won great success and captured many towns, In recognition of his services Garcia was appointed a Brigadier-General under Gomez, and subsequently succeeded that officer as commander-in-chief of the Cuban army. In 1873 he was captured and sent to Spain, where he was pardoned in 1878. Returning to Cuba, he again took up arms against Spain in what is known as the "Little War." Later he was forced to surrender and a second time sent to Madrid, where for 17 years he remained under the espionage of the police. He escaped in September, 1895, and took passage for New York. On Jan. 26, 1896, he led a successful filibustering expedition to Cuba. Later, while planning a second expedition, he was arrested by United States Government officers, gave bail, which he forfeited, and again landed in Cuba. When Santiago was taken by the Americans in 1898 he withdrew from the Cuban army because he was not given the command of that city. Subsequently, however, he accepted the new conditions. In November, 1898, he was sent to the United States as chairman of a commission authorized to lay before President McKinley the wishes of the Cuban leaders, but before accomplishing this duty he died in Washington, D. C., Dec. 11, 1898. His remains received official and military honors in Washington.

GARCIA, MANUEL (gär-thē′ä), a Spanish vocalist and composer; born in Seville, Spain, Jan. 22, 1775. After ac-

quiring a considerable reputation as a tenor singer in Cadiz and Madrid, in 1808 he obtained great success at the Italian opera in Paris, and afterward proceeded to Italy, where he was received with equal favor. From 1816 to 1824 he was constantly engaged as a singer, either in Paris or London. In 1825, with a select operatic company, composed in part of members of his own family, he crossed the Atlantic, and visited New York and Mexico. On the road between Mexico and Vera Cruz he was robbed of all his money; and after his return to Paris he was compelled to open a class for singing, as his voice had become greatly impaired by age and fatigue. Many of Garcia's pupils reached a high degree of excellence, but none equaled his eldest daughter Maria, afterward Madame Malibran. He was less successful as a composer, though several of his works, such as "The Caliph of Bagdad," were much admired. Garcia died in Paris, June 10, 1832. PAULINE VIARDOT-GARCIA, his second daughter, born in Paris in 1821, acquired a considerable reputation as a mezzo-soprano singer, and also composed several operettas and songs.

GARCILASO (gär-thē-lä'sō), a Spanish historian; born in Cuzco, Peru, in 1540. He was son of Garcilaso de la Vega, one of the conquerors of Peru, and was surnamed the Inca, from his mother, a princess of the royal race of the Incas. At the age of 20 he went to Spain, and lived the rest of his life at Cordova. His first work (1605) was an account of the conquest of Florida by Fernando de Soto. In 1609 appeared the first, and eight years later the second part of his great work on the history of Peru, entitled "Royal Commentaries"; translated into English by Sir Paul Rycaut (1688), and by C. R. Markham for the Hakluyt Society (1869). He died in Cordova, Spain, in 1616.

GARCINIA (named after Laurent Garcin, an Oriental traveler), in botany, a genus of guttifers, the typical one of the tribe *Garcinieæ*. The fruit of *G. mangostana* is the highly-prized mangosteen. The fruits of *G. pedunculata*, *G. cornea*, and *G. kydiana* are also eaten, but are not greatly valued. *G. cambogia* and other species of the genus furnish GAMBOGE (*q. v.*).

GARD (gär), a department in the S. of France, on the Mediterranean; bounded on the E. by the Rhône river; area, 2,253 square miles, one-third of which is arable; pop. about 414,000. It is watered mainly by the Rhône, and by its tributaries, the Gard—from which the department has its name—and the Cèze. Of its surface the N. W. is occupied by a branch of the Cévennes, the remainder slopes toward the Rhône and the Mediterranean, the coast being lined by extensive and unhealthy marshes. The soil is unequal, the best land occurring in the river valleys. The famous grapes have almost disappeared before the ravages of the phylloxera. The rearing of silkworms is widely engaged in, and the cultivation of olives and chestnuts is of value. The minerals include coal, iron, argentiferous lead, antimony, marble, and salt; and the department's iron and steel works are important. Chief city, Nîmes. Pop. about 80,000.

GARD, PONT DU (pôn dü), a fine Roman aqueduct, in Gard, 10 miles from Nîmes, joining two mountains and passing over the Gardon. It has three tiers of arches, and is 160 feet high.

GARDA (gär'dä), **LAKE OF** (the Lacus Benacus of the Romans), the largest lake of Italy, between Lombardy and Venetia, its N. end extending into the Austrian Tyrol. Situated 216 feet above sea-level, it has an area of 115 square miles, a length of 37 miles, a breadth of 2 to 11 miles, and a maximum depth of 1916 feet. Its chief tributaries are the Sarca and Ponale, and it is drained by the Mincio, a tributary of the Po. Along the W. shore the mulberry, fig, grape, myrtle, and citron are grown in the sheltered gardens, many of them terraced; olives flourish most on the opposite bank. The clear waters of the lake abound in fish of various kinds. The mild climate in the district of the lake, and the beauty of its vicinity, have caused its shores to be lined with beautiful villas; and the district between Garguano and Salo, called by the people La Riviera, passes for the warmest point in northern Italy. Arco, near the head of the lake, is a favorite winter resort.

GARDEN. The earliest gardens of which there is any account are those of Solomon, which are described as having been of quadrangular form, surrounded by high walls. They contained aviaries, wells, and streams of water. The gardens of Cyrus and other Persian monarchs were of great extent, and generally laid out in romantic situations. The first allusion to terraces in gardens is to be found in the description of the celebrated hanging gardens of Babylon. The terraces are described as being furnished with groves, containing fountains, seats, parterres, and banqueting rooms, and as combining the minute beauties of flowers and foliage with masses of light and

shade and extensive prospects. The grove of Orontes, described by Strabo, must be regarded as a park or large garden in the picturesque style; it was 9 miles in circumference. In ancient Greece, gardening was rather a neglected art at first, but in process of time great advance was made. The vale of Tempé, the Academus at Athens, and other public gardens, were extremely elegant, and were ornamented with temples, altars, tombs, statues, monuments, and towers. The Greeks copied their gardening from the Persians; and the Romans, in their turn, followed the pattern and style of the Greeks. See HORTICULTURE; GRAFTING; HOTBED.

GARDEN, MARY, an American soprano. Born in 1877 at Aberdeen, Scotland, her parents moved to America when she was very young. In Chicago she learned to play both the violin and piano and when sixteen placed herself under the instruction of Mrs. Duff of Bangor, Me. After training her voice for two years she continued her vocal studies in Paris under eminent teachers. Making her début in Paris in 1900 she was a striking success from the first. In 1908 she became a member of the Manhattan Opera Company of New York and remained with them two years. From 1910 to 1920 she was connected with the Chicago Opera Company. Her favorite operas were those of the modern French school and she excelled in her dramatic work particularly in such an opera as "Thaïs." In 1921 she was appointed general director of the Chicago Opera Co.



MARY GARDEN

GARDEN CITY, a village on Long Island, N. Y.; on the Long Island railroad; 18 miles E. of New York City. It was founded by Alexander T. Stewart as a residential town. It is the seat of the Protestant Episcopal bishop of Long Island, and contains the Cathedral of the Incarnation, which was consecrated in May, 1885, having been erected by his widow as a memorial to Mr. Stewart. Here are also the Cathedral Schools of St. Mary and St. Paul.

GARDENIA, a genus of trees and shrubs, natural order *Rubiales*, natives of tropical Asia and Africa, bearing beautiful white or yellowish flowers of great fragrance. The genus was named after Dr. Garden, of Charleston, S. C.

GARDEN SPIDER, also called diadem, or cross spider, the *Epeira diadema*, a common British spider the dorsal surface of which is marked with a triple yellow cross. It forms a beautiful geometric web.

GARDINER, a city in Kennebec co., Me.; on the Kennebec river, and on the Maine Central railroad; 6 miles S. W. of Augusta. It has admirable waterpower, derived from the Cobossee river, and has valuable manufacturing interests, including sawmills, paper mills, potteries, furniture, carriage, woolen, boot and shoe, sash, blind, and door factories. There are electric lights and street railroads, waterworks, public library, 3 National banks, and an assessed property valuation of $4,000,000. The ice cutting industry employs 1,000 people; annual output valued at $75,000. Pop. (1910) 5,311; (1920) 5,475.

GARDINER, SAMUEL RAWSON, an English historian; born in Ropley, Hampshire, England, March 4, 1829. He was educated at Winchester and at Christ Church, Oxford, taking a first-class in 1851. For some years he filled the chair of modern history at King's College, London, but resigned it in 1885 to continue his history at Oxford on an All Souls' elective fellowship. He wrote: "The History of England from the Accession of James I. to the Disgrace of Chief Justice Coke" (1863); "Prince Charles and the Spanish Marriage" (1869); "The Thirty Years' War" (1874); "The First Two Stuarts and the Puritan Revolution" (1875) in "Epochs of Modern History"; "England under the Duke of Buckingham and Charles I." (1875); "The Personal Government of Charles I." (1877); "Introduction to the Study of English History" (1881), written in conjunction with Mr. J. Bass Mullinger; "The Fall of the Monarchy of Charles I." (vols. i. and ii. 1882). He edited the "Fortescue Papers," the "Hamilton

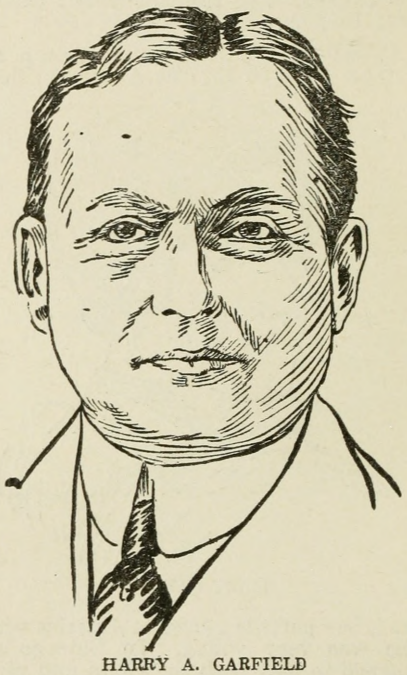
Papers," the "Parliamentary Debates in 1610," and "Debates in the House of Commons in 1625." He died Feb. 23, 1902.

GARDINER, STEPHEN, an English prelate, believed to have been a natural son of Lionel, Bishop of Salisbury, and brother of Elizabeth Woodville, queen of Edward IV.; born in Bury St. Edmunds, Suffolk, England, in 1483. In 1520 he took the degrees of D. D. and LL. D. at Cambridge, where he became master of Trinity Hall. He passed at this time by the name of Dr. Stephens. Having become secretary to Wolsey and a favorite with the king, he was dispatched to Rome in 1528 to forward Henry VIII.'s divorce, and on his return was appointed secretary of state, and in succession Archdeacon of Norwich and Leicester, and Bishop of Winchester. He also went on various embassies to France and Germany. He supported the king in renouncing the authority of the Pope, but opposed the doctrines of the Reformation, and took an active part in the passing of the six articles and in the prosecution of Protestants. He was successful in contriving the fall of his opponent Cromwell, but failed to injure Catherine Parr, and fell into disfavor. During the reign of Edward he was imprisoned in the Fleet, deprived of his bishopric, and afterward imprisoned in the Tower from 1548-1553, but Mary restored him to his bishopric, and appointed him lord chancellor. He officiated at her coronation and marriage, and became one of her chief advisers. He took an active part in the persecutions at the beginning of the reign. He died in London, Nov. 12, 1555.

GARDNER, a town in Worcester co., Mass., including the villages of Gardner Center, South Gardner, and West Gardner; on the Fitchburg railroad; 25 miles N. of Worcester. It is the trade center for an extensive agricultural region, and has manufactories of rattan goods, gas and oil stoves, chairs, foundry, and machine-shop products, electric lights, street railroads, waterworks, the Levi Haywood Memorial Library, high school, 2 National banks, and an assessed valuation of $5,500,000. Pop. (1910) 14,699; (1920) 16,971.

GARFIELD, a borough of New Jersey, in Bergen co. It is on the Erie railroad, and on the Passaic river. It has industries of great importance, including woolen mills, knitting mills, stone works, a machine shop, and manufactures of clothing, chemicals, rubber goods, cigars, paper boxes, etc. Pop. (1910) 10,213; (1920) 19,381.

GARFIELD, HARRY AUGUSTUS, an American educator and public official. Born in 1863 in Ohio, the son of James Abram Garfield, twentieth President of the United States. After graduating from Williams College in 1885, he studied law at Columbia University and at Oxford, England. From 1888 to 1903, he practiced law in Cleveland, Ohio, and in the latter year became professor of politics in Princeton University. In 1908 he became president of Williams College. When the United States entered the World War, President Wilson appointed him Fuel Administrator.



HARRY A. GARFIELD

His duties gave him practically unlimited control over the enormous fuel supplies of the United States and made him an important official in the Government. He resigned his position a few months after the armistice in 1918, to return to the presidency of Williams College.

GARFIELD, JAMES ABRAM, an American statesman, 20th President of the United States; born in Orange, O., Nov. 19, 1831. The family home was a small log cabin in the Ohio "wilderness," a region now known as the Western Reserve. He went to school winters, and became an omnivorous reader, especially of the Bible. In the winter of 1849-1850 he attended a seminary at



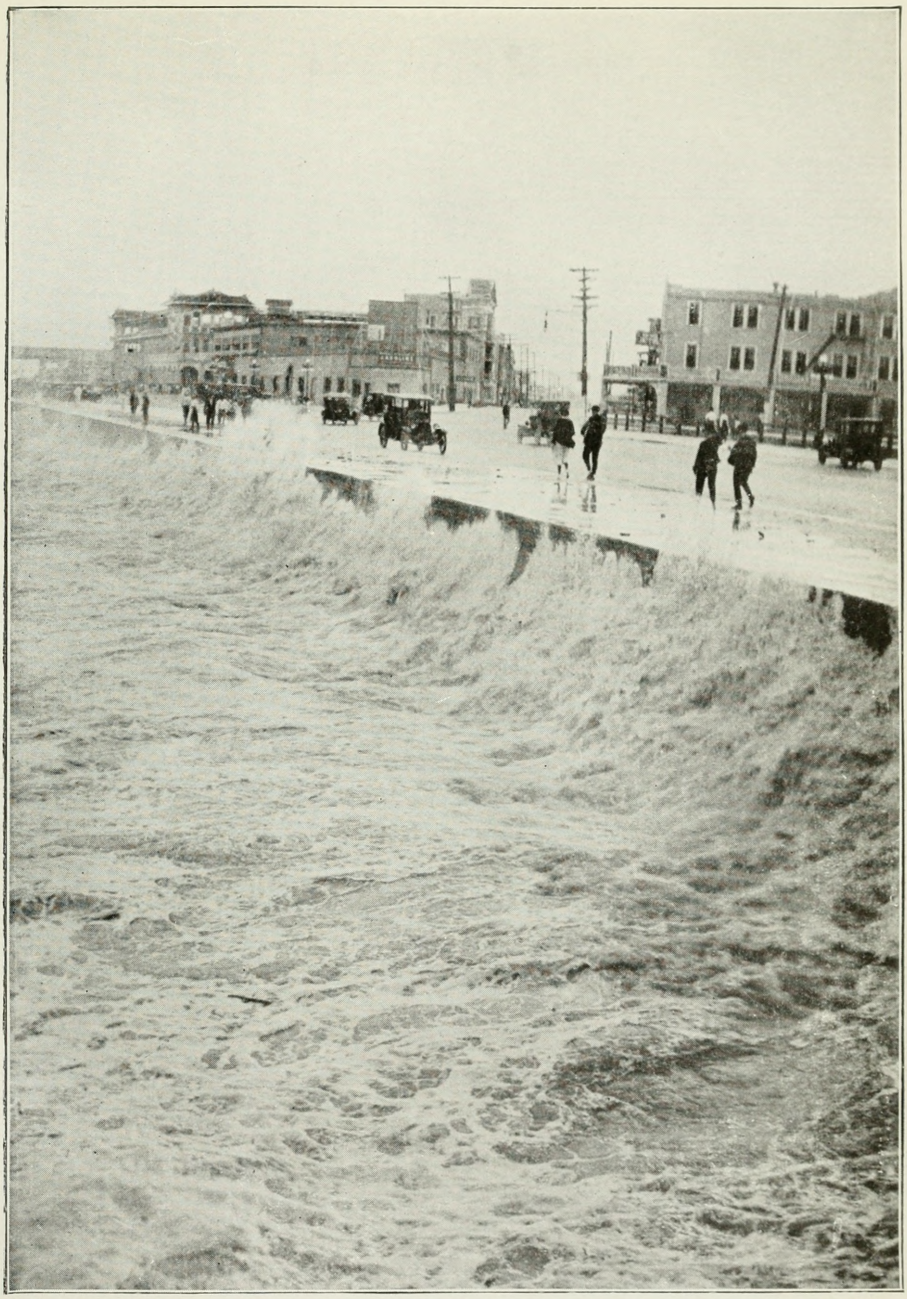
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A BATTLEFIELD IN FRANCE, SHOWING THE CHALKY SOIL OF THE CHAMPAGNE. THE SITE WAS ONCE HURLUS FOREST



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THE FUR INDUSTRY ON PRINCE EDWARD ISLAND. THE SILVER-FOX SKINS WERE PRODUCED ON A FOX FARM



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THE GALVESTON SEA WALL AFTER A STORM



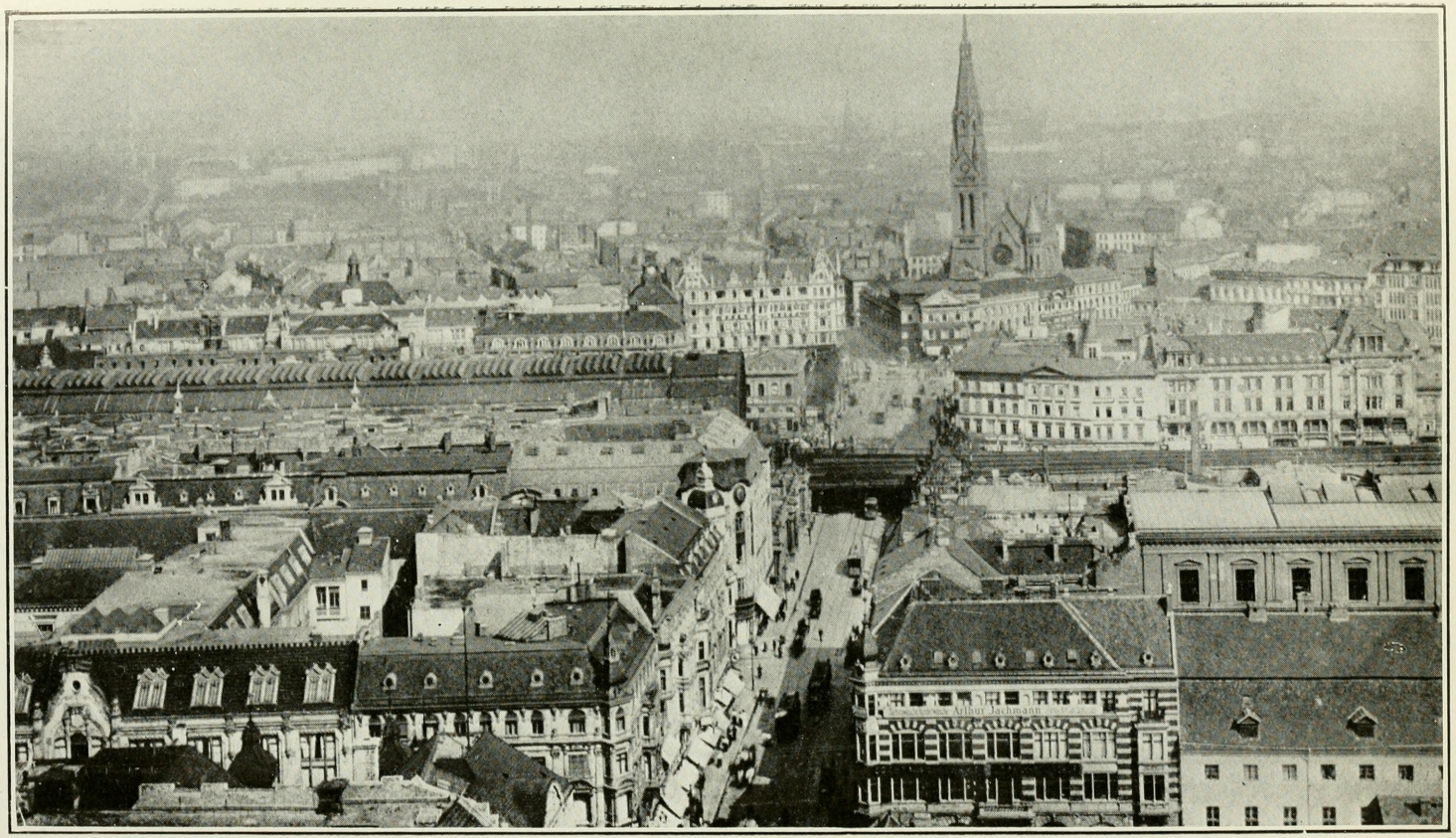
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ATLANTA'S "FLATIRON" BUILDING, BROAD AND PEACHTREE STREETS, ATLANTA, GA.



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SHIPS OF MANY NATIONS IN THE HARBOR OF GENOA, ITALY



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THE CITY OF BERLIN, GERMANY



Photo, Ewing Galloway

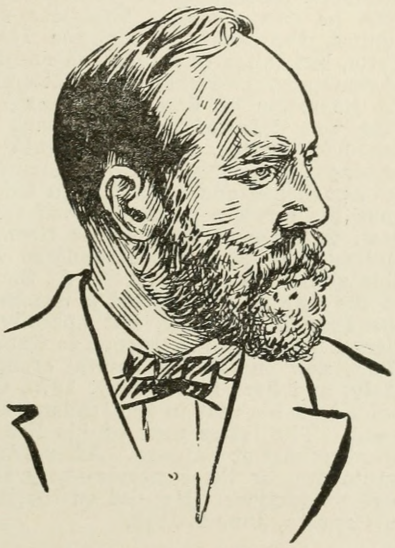
A VIEW OF HAMBURG, GERMANY



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GENEVA, LOOKING ACROSS ROUSSEAU ISLAND. MONT BLANC IS IN THE DISTANCE AT THE LEFT

Chester, O., learned the trade of a carpenter during vacations, and was able to support himself in school from that time by his own exertions. In 1851 he entered an institute at Hiram, O. (now Hiram College), and went thence in 1854 to Williams College, and graduated in 1856. In 1857 he was made president of Hiram College, where he won reputation as an educator. In 1859 he was elected to the Ohio State Senate. In 1861 he was commissioned lieutenant-colonel of the 42d regiment of Ohio Volunteers, and was made a Brigadier in a few months. During the war he distinguished himself more or less at Middle Creek, Shiloh, Corinth, and Chickamauga. In 1863 he left the army to enter Congress, declining the offer of



JAMES A. GARFIELD

a division command under Thomas. He remained in Congress 16 years. In 1880 he was elected United States Senator from Ohio, but in June the Republican National Convention nominated him to the presidency, and he was elected in November. A controversy arose early in his administration over the Federal offices in New York, especially the office of collector of the port of New York City, which led to the resignation from the United States Senate of Roscoe Conkling and Thomas C. Platt, of New York, after a bitter and heated contest in the Senate over the confirmation of Garfield's appointees. On July 2, 1881, when passing through the Baltimore and Potomac passenger station in Washington, in company with Mr. J. G. Blaine, to go on board a train, Garfield was shot by Charles J. Guiteau, a disappointed office-seeker. Garfield lived till Sept. 19, being cared for in a seaside residence at Elberon, N. J. His funeral was a state affair of great solemnity and pomp. A beautiful monument was raised over his remains in a cemetery overlooking Lake Erie, at Cleveland, O.

GARFIELD, JAMES RUDOLPH, an American public official. Born at Hiram, Ohio, in 1865, the son of President Garfield, of the United States. After graduating from Williams College in 1885, he studied law at Columbia University and was admitted to the bar in 1888. After serving as a member of the Ohio Senate he became in 1903, Commissioner of Corporations in the United States Department of the Interior. In 1907 President Roosevelt appointed him Secretary of the Interior, a position he held until the close of Roosevelt's administration. He took a prominent part in formulating and carrying out the President's conservation policies. Upon leaving the cabinet he took up the practice of law in Cleveland, Ohio.

GARFISH, SEAPIKE, or **GARPIKE** (*Belone vulgaris*), a fish, known also as the sea needle, making its appearance a short time before the mackerel in their annual visit for spawning. It is long and slender, sometimes 2 or 3 feet in length. The name garfish, or garpike, is also given to other species of *Belone*, and to a ganoid fish of the genus *Lepidosteus*, found in the fresh waters of America.

GARGANO (gär-gä'nō) (ancient Garganus), a mountainous peninsula, the "spur" of Italy, in the province of Foggia, jutting out about 30 miles into the Adriatic Sea, and attaining in Monte Calvo a height of 3,460 feet. Bee-keeping is yet as generally engaged in as in the time of Horace. The district is visited mainly by pilgrims to a shrine of St. Michael on Monte St. Angelo.

GARGARA (gär'ga-rä) (Turkish Kasdagh), the highest mountain of the ridge of Ida, in Asia Minor, near the Gulf of Adramyti, on the N.

GARGIL, or **GARGOLS**, a distemper in geese, affecting the head.

GARGOYLE, GARGOIL, or **GURGOYLE** (French *gargouille*=the weasand of the throat), in architecture, a quaintly-formed head of a man or animal, employed as a decorative spout for the rain water from a roof.

GARHMUKHTESAR (gur-mök-tes' ur), an ancient town in the Northwest

provinces of India, on the Ganges, 26 miles S. E. of Meerut, with four shrines dedicated to Gangâ, and a great fair, which attracts 200,000 pilgrims. Pop. about 8,000.

GARHWAL (gur-wäl'), a native state in the Northwest provinces of India, on the borders of Tibet; area, 4,164 square miles; pop. about 270,000. Also the name of a British district in the Northwest provinces, next to independent Garhwal; area 5,500 square miles; pop. about 300,000. Being on the S. slope of the Himalayas, Garhwal is for the most part a mass of rugged mountain ranges, whose elevation above the sea reaches in Nanda Devi 25,661 feet. The native state is the cradle of both the Jumna and the Ganges, and in the district are the Alaknanda and its point of junction with the Bhagirathi (see GANGES); consequently, crowds of pilgrims are attracted to the peculiarly sacred localities of Deoprayag and Gangotri.

GARIBALDI, GIUSEPPE (gä-rē-bäl'dē), an Italian patriot; born in Nice, France, July 4, 1807. His father being a poor fisherman, he got little education, and for a number of years was a sailor on various trading vessels. In 1834, being condemned to death for his share in the schemes of Mazzini, he escaped to Marseilles, and finally went to South America. In the service of the Republic of Rio Grande against the Brazilians, he became known as a brilliant leader, and with his famous Italian legion he subsequently gave the Montevideans such effective aid against Buenos Aires as to earn the title of "hero of Montevideo." In 1848 he returned to Italy, raised a band of volunteers, and harassed the Austrians till the re-establishment of Austrian supremacy in Lombardy. He then retired to Switzerland, but in the spring of 1849 proceeded to Rome to support Mazzini's republic. He was appointed to command the forces, but the odds were overwhelming, and after a desperate defense of 30 days Garibaldi escaped from Rome with 4,000 of his followers. In the course of his flight his wife Anita died from fatigue and privations. He reached the United States, and was for several years in command of a merchant vessel. He then purchased a part of the small island of Caprera, off the N. coast of Sardinia, and made this his home for the rest of his life. Latterly the subscriptions of his admirers enabled him to become owner of the whole island.

In the war of 1859, in which Sardinia recovered Lombardy, Garibaldi and his Chasseurs of the Alps did splendid service; and on the revolt of the Sicilians in 1860 he crossed to the island, wrested it after a fierce struggle from the King of Naples, recrossed to the mainland and occupied Naples, where he was proclaimed dictator of the Two Sicilies. It was now feared that Garibaldi might prove untrue to his motto—Italy and Victor Emmanuel—but he readily acquiesced in the annexation of the Two Sicilies to Italy, and declining all honors retired to his island farm. In 1862 he endeavored to force the Roman question to a solution, and entered Calabria with a small following, but was taken prisoner at Aspromonte by the royal troops. He was soon released, however, and returned to Caprera. In 1864 he received an enthusiastic welcome in Great Britain. In 1866 he commanded a volunteer force against the Austrians in the Italian Tyrol, but failed to accomplish anything of consequence. Next year he attempted the liberation of Rome, but near Mentana was defeated by the French and pontifical troops, and was again imprisoned by the Italian Government, but soon pardoned and released. In 1870 he gave his services to the French republican government against the Germans, and with his 20,000 men rendered valuable assistance in the S. E. At the end of the war he was elected a member of the French assembly, but speedily resigned his seat and returned to Caprera. Rome now became the capital of united Italy, and here in January, 1875, Garibaldi took his seat in the Italian parliament. The latter part of his life was spent quietly at Caprera. After 1870 he wrote two or three novels—very mediocre productions. He died on the island of Caprera, June 2, 1882.

GARIGLIANO (gä-rēl-yä'nō) (ancient Liris; in its upper course now called Liri), a river of southern Italy, rising in the Abruzzi, W. of the former Lake of Fucino, and flowing after a generally S. course of 90 miles, into the Gulf of Gaeta. It is navigable below Pontecorvo, and abounds with fish. On its banks in 1503 was fought a famous battle between the French and the Spaniards, commanded by Gonsalvo de Cordova, in which the former were totally routed, though Bayard is said single-handed to have held the bridge against 200 Spaniards.

GARLAND, HAMLIN, an American story writer; born in West Salem, Wis., Sept. 16, 1860. His works include: "Main Traveled Roads" (1891); "A "Spoil of Office"; "Prairie Folks"; "Prairie Songs" (1893); "Crumbling

Idols"; "Little Norsk"; (1893); "Rose of Dutcher's Coolly" (1895); "Jason Edwards"; "The Eagle's Heart" (1900); "The Captain of the Gray Horse Troop"



HAMLIN GARLAND

(1902); "Hesper" (1904); "The Forester's Daughter" (1914); "A Son of the Middle Border" (1917).

GARLASCO, a town of northern Italy, in Piedmont, 24 miles S. E. of Novara. Near this place the Austrians crossed the Po, when invading Italy in 1849.

GARLIC, in botany, *Allium sativum*, a perennial plant with a compound bulb composed of 10 to 12 smaller ones, called cloves, flat, narrow, erect, and pointed leaves, flowers akin to those of the onion, whitish or pinkish. It is used in Sicily, and some parts of Provence. It is cultivated in Portugal and other parts of the continent. The peasantry eat their bread with slices of it. In pharmacy, garlic, like other species of *Allium*, is stimulant, diuretic, and expectorant.

GARNET, an isometric transparent or translucent brittle mineral, with dodecahedral cleavage, sometimes with twin crystals, having an octahedral composition face. It occurs also massive and lamellar. Color, red, brown, yellow, white, or black, with a white streak. There are three leading varieties: (1) Alumina garnet, in which the sesquioxide is mainly alumina; (2) Iron garnet, in which it is chiefly sesquioxide of iron; and (3) Chrome garnet, in which it is principally sesquioxide of chrome. Under these are ranked grossularite, pyrope, almandite, spessartite, andradite, bredbergite, and ouvarovite.

GARNETT, RICHARD, an English philologist; born in Otley, Yorkshire, England, July 25, 1789. He had already tried commerce and the Church, when in 1838 he was appointed assistant keeper of printed books at the British Museum. One of the founders of the Philological Society, he contributed many striking papers (on Celtic subjects, largely) to its "Proceedings" and to the "Quarterly Review." These were collected by his son in "Philological Essays" (1859). He died Sept. 27, 1850. RICHARD, his son, born in Lichfield, Feb. 27, 1835, was appointed in 1851 assistant in the printed book department of the British Museum, where also he became superintendent of the reading room in 1875. This office he resigned in 1884 to devote himself more exclusively to the printing of the "Museum Catalogue," of which he had had charge from its commencement. He published: "Relics of Shelley" (1862); "Selections of Shelley's Poems" (1880) and "Letters" (1882); "De Quincey's English Opium Eater" (1885); "Life of Carlyle" (1887); "Life of Milton" (1890); "Poems" (1893); "History of Italian Literature" (1898); "Essays in Librarianship and Bibliography" (1899); "Essays of an Ex-Librarian" (1901) "English Literature" with Edmund Gosse (1903-1904). He died in 1906.

GARNISHMENT, in law, (1) a warning or legal notice to the agent or attorney of an absconding debtor to appear in court or give information. (2) A warning or legal notice not to pay money, etc., to a defendant, but to appear and answer to a plaintiff creditor's suit. (3) A fee.

GARO (gä'rō) **HILLS**, a district of India, forming the S. W. corner of Assam; area, 3,350 square miles. It is a mountainous and forest region intersected by tributaries of the Brahmaputra. The native Garos are a robust and active race. Among them the wife is regarded as the head of the family, and property descends through females. Pop. about 154,000.

GARONNE (gä-ron') (ancient Garumna), the principal river in the S. W. of France, rising within the Spanish frontier in the Val d'Aran, at the base of Mount Maladetta, in the Pyrenees, 6,142 feet above sea-level. About 26 miles from its source it enters the French ter-

ritory in the department of Haute Garonne, flows in a general N. E. course to Toulouse, then bends to the N. W., and continues to flow in that direction till joined by the Dordogne, about 20 miles below Bordeaux, and widening afterward into the estuary which bears the name of the Gironde, it enters the Atlantic at the Pointe de Grave. The estuary, the largest in France, is nearly 50 miles long. The total length of the river is about 346 miles; it drains an area of about 22,020 square miles. Its navigation, which, however, is much impeded above Toulouse, commences for small craft at Cazères; ocean steamers go up to Bordeaux. Its principal affluents are the Tarn, Lot, and Dordogne, on the right; and on the left, the Save, Gers, and Baise. At Toulouse it is joined by the Canal du Midi, which running E. to the Mediterranean, forms with the Garonne a means of communication between that sea and the Atlantic; and the river's own "side canal," starting also from Toulouse, runs along the right bank, receives the Montauban canal, and spans several streams in its course, crossing the Garonne itself at Agen by a magnificent viaduct, and returning to the river at Castets, after a total length of 120 miles. The valley of the Garonne is noted for the beauty of its scenery, but is liable to destructive inundations.

GARONNE, HAUTE, a department in the S. of France, embracing portions of ancient Gascony and Languedoc; area 2,457 square miles, Pop. about 432,000. It is watered throughout by the Garonne, from which it derives its name, and within the basin of which it wholly lies. Occupied in the S. by a branch of the Pyrenean range, the slope of the department and the course of its streams are toward the N. and N. E. Apart from this S. mountainous region, the department is hilly and fertile. The soil in the valleys is remarkably productive, and bears heavy crops of wheat, maize, flax, hemp, potatoes, and rape seed. Orchard fruits and chestnuts are produced in abundance, and the annual yield of wine is over 20,000,000 gallons, two-thirds of which is exported. The chief manufactures are woolen and cotton fabrics, paper and hardware. Capital, Toulouse.

GAROO, a trading station of the Chinese empire, near a source of the Indus, 16,000 feet above sea-level; lat. 31° 40′ N., lon. 80° E. Here an active commerce is carried on in exchanging Chinese and Tibetan commodities for those of India and Kashmir.

GARRICK, DAVID, an English actor; born in Hereford, England, Feb. 20, 1716. His grandfather was a French refugee, his father a captain in the army. He was educated at Lichfield grammar school, spent a short time at Lisbon with an uncle, and returning to Lichfield was placed under Samuel Johnson, who was induced to accompany him to the metropolis (1736). Garrick then began to study for the law, but on the death of his father joined his brother Peter in the wine trade. He had, however, as a child a strong passion for acting, and in 1741 he joined Giffard's company at Ipswich under the name of Lyddal. At Giffard's theater in Goodman's fields he achieved a great success as Richard III., and in 1742 was not less successful at Drury Lane. In 1745 he became joint manager with Mr. Sheridan of a theater in Dublin, and after a season at Covent Garden (1746) purchased Drury Lane in conjunction with Mr. Lacy, opening it Sept. 15, 1747, with the "Merchant of Venice." From this period may be dated a comparative revival of Shakespeare, and a reform both in the conduct and license of the drama. He had already written his farces of "The Lying Valet," "Lethe," and "Miss in her Teens"; and in 1766 he composed, jointly with Colman, "The Clandestine Marriage." After the death of Lacy in 1773 the sole management of the theater devolved on Garrick till 1776, when he sold his moiety of the theater for £37,000, performed his last part, Don Felix in "The Wonder," for the benefit of the theatrical fund, and bade an impressive farewell to the stage. As a man Garrick was highly respected, the chief defect of his character being vanity. As an actor he ranks with the best and was almost equally great both in tragedy and in comedy. He died in London, Jan. 20, 1779, and was buried with great pomp in Westminster Abbey.

GARRISON, a military term signifying a body of troops stationed in a fort or fortified place to defend it from the enemy, or to keep the people around in subjection; also a fort or fortified place manned with soldiers, guns, etc.; also the state of being stationed in a fort or fortified place for its defense, a doing duty in a garrison; winter quarters for troops.

GARRISON, LINDLEY MILLER, an American lawyer and public official. He was born in Camden, N. J., in 1864, and was educated at Phillips Exeter and Harvard University. After graduating from Harvard he studied law in Philadelphia, being admitted to the bar in 1886. After building up a considerable practice he became in 1904 vice-chancellor of New Jersey, and in 1913

President Wilson appointed him Secretary of War. In Feb., 1916, he resigned from the cabinet because of a serious difference with the President on the question of the new "Preparedness" program.



LINDLEY M. GARRISON

He again resumed the practice of law in New York City as a member of the firm of Hornblower, Miller, Garrison, and Potter.

GARRISON, MABEL, (MRS. GEORGE SIEMONN), an American opera singer, born in Baltimore, Md. She graduated from the Western Maryland College and studied music at the Peabody Conservatory of Music, in Baltimore. She first attracted attention as a choir singer in that city. Her first appearance as an opera singer was made in "Mignon" at the Boston Opera House, in 1912. She was at once successful and in 1914 joined the Metropolitan Opera House. She appeared frequently in concerts and also as a soloist with the leading orchestras.

GARRISON, WILLIAM LLOYD, an American reformer; born in Newburyport, Mass., Dec. 12, 1805. He was apprenticed to a shoemaker, but eventually became a compositor on the Newburyport "Herald." In 1827 he became editor of the "National Philanthropist," the first American temperance journal, and afterward on a journal in support of the election of John Quincy Adams. With Mr. Lundy, a Quaker, he then started the paper called the "Genius of Universal Emancipation" (1829), his denunciations of slave-traders leading to his imprisonment for libel. On his release he commenced lecturing in Boston, started the "Liberator" (1831). In 1832 appeared his "Thoughts on African Colonization," and in the same year he established the American Anti-Slavery Society. He subsequently visited England, where he was welcomed by Wilberforce, Brougham, Buxton, etc. In 1835 he was saved with difficulty from a Boston mob; but his principles made steady progress till 1865, when the Anti-Slavery Society was dissolved with its work accomplished. A volume of sonnets (1843) and one of selections (1852) bear his name. He died in New York City, May 24, 1879.

GARROTE, or **GARROTTE**, a Spanish instrument of execution. The victim, usually in a sitting posture, is fastened by an iron collar to an upright post, and a knob operated by a screw or lever dislocates the spinal column, or a small blade severs the spinal cord at the base of the brain.

GARRY, a river in Scotland, county of Perth, joining the Tummel after a course of 20 miles. It is celebrated for its picturesque scenery.

GÁRSHIN, VSEVOLOD MICHAILOVICH (gär'shin), Russian novelist; born in Bachmut, Yekaterinoslav, Feb. 14, 1855. He took part in the Russo-Turkish war, and was wounded at Charkow. He soon after finished his great work, "Four Days." "A Very Little Story," "The Night," and several more novels, came from his pen during the next few years. He developed a tendency to melancholy (occasionally developing into insanity), traces of which are to be found in "Attalea Princeps" and "Night," and in the psychiatrical study of "The Red Flower." He died in St. Petersburg, April 5, 1888.

GARTER SNAKE, in zoölogy, the snake genus *Eutania*. There are two species, *E. sirtalis* and *E. ordinata*, the latter in the Southern States, the other more widely diffused over the Union. Their bite is not venomous.

GARVIN, JAMES LOUIS, an English editor. He was born in Ireland in 1868, and was brought at an early age to England, where he was educated in Catholic elementary schools, in which later, in Liverpool and Hull, he was a pupil teacher. Removing to Newcastle, he became first a reporter and later a leader writer on the Newcastle "Chronicle," from which in 1899 he went to join the political staff of the London "Daily

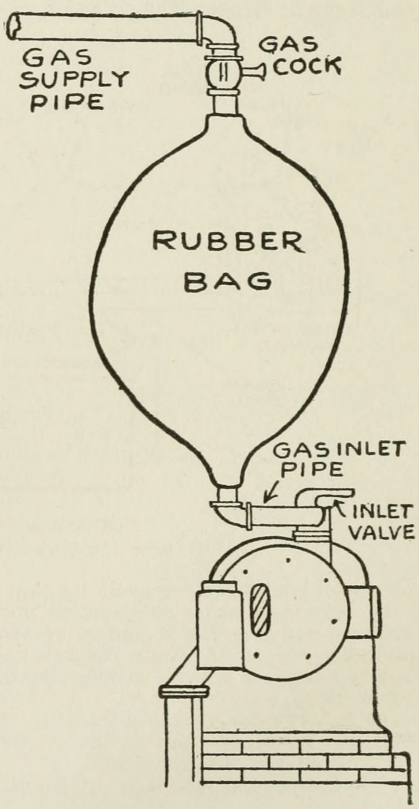
Telegraph." In 1905 he became editor of "The Outlook," and in 1908 of "The Observer," writing also, 1912-1915, for the "Pall Mall Gazette." He was originally a strong Parnellite, but on joining "Daily Telegraph" became a Tory Imperialist. Has contributed much to the reviews. Publications: "Imperial Reciprocity"; "Tariff or Budget"; "Economic Foundations of Peace."

GARY, a city of Indiana, in Lake co. It is on the Indiana, Baltimore, and Ohio, the Chicago, Indiana and Southern, the Elgin, Joliet and Eastern, and other railroads. The city is at the head of Lake Michigan and lies halfway between the great iron ore beds of the north and the coal regions of the south. Its advantageous situation in regard to coal and iron led to the selection of the site for the main plant of the United States Steel Corporation, in April, 1906. The city has become the greatest steel producing city in the world. It contains plants of the American Bridge Works, the Indiana Steel Company, tin-plate works, locomotive works, coke by-product works, etc. It has a public library, a handsome city hall, a hospital, and several public parks. Pop. (1910) 16,802; (1920) 55,378.

GARY, ELBERT HENRY, an American lawyer and capitalist, born near Wheaton, Ill. He was educated in the public schools and Wheaton College, and at the University of Chicago. After studying law at the latter institution, he was admitted to the bar in 1867. He was engaged in the general practice of law in Chicago for 25 years, but retired from law practice to become president of the Federal Steel Co. He was prominently identified with the organization of the United States Steel Corporation, of which he became chairman of the board of directors and chairman of the finance committee. He was president of the American Iron and Steel Institute and, in 1893-1894, was president of the Chicago Bar Association.

GAS, in chemistry, a substance possessing the condition of perfect fluid elasticity, and presenting under a constant pressure a uniform rate of expansion for equal increments of temperature, but when reaching its maximum density behaving like a vapor. All gases can be condensed into liquids by cold and pressure. Some of the elements, as oxygen, hydrogen, nitrogen, chlorine, and probably fluorine, are gases at ordinary temperatures. Atmospheric air is a mechanical mixture of 77 parts by weight of nitrogen, and 23 of oxygen, or 79 volumes of nitrogen mixed with 21 volumes of oxygen. Gases are formed by the dry distillation of animal and vegetable substances, which yield carbon dioxide, carbon monoxide, ammonia, nitrogen, hydrogen, sulphur dioxide, hydrogen sulphide, and hydrocarbons.

The gas of commerce is carburetted hydrogen (CH_4). Its frequent disengagement in coal mines with resultant explosions, generally fatal to many lives, has caused the miners to give it the name of fire-damp. In parts of the world it issues from crevices or holes in the strata in so moderate and continuous a stream, as to burn with a huge jet instead of exploding. It was discovered in the United States about 1845, and is known as natural gas. Gas wells abound in Ohio, Indiana, Pennsylvania, and the West. This natural gas serves the purposes of illuminating and heating. The



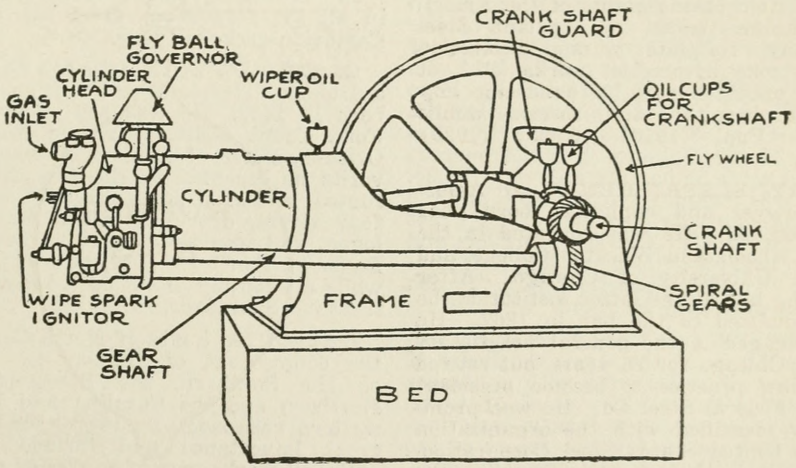
GAS SUPPLY OF OTTO GAS ENGINE

ignition of carburetted hydrogen may be seen in any coal fire. It has been discovered that giant jets of apparently

similar gas flames exist in the sun, and are one main source of its light and heat

GAS ENGINE, an engine in which motion is given to the piston by the compression and expansion or explosion of a mixture of a combustible gas and air. The first effective gas engine was brought into public use by M. Lenoir in 1860. In the Otto engine the cylinder is generally horizontal and single-acting, with a trunk piston, and it takes two revolutions of the crank shaft to complete a cycle of operations. During the first forward stroke gas and air are drawn in, in the proportion proper to form an explosive mixture; during the first backward stroke the mixture is compressed into a large clearance space behind the piston. When the next forward stroke is about to begin, the compressed mixture is ignited, and work is done by the heated gases during the second forward stroke. The second backward stroke completes the cycle by causing the burned gases to be expelled into an exhaust pipe leading to the outer air. Since only one of the four strokes required to complete a cycle is effective in doing work, a heavy flywheel is used to furnish a large magazine of energy. A centrifugal governor controls the engine by cutting off the supply of gas.

An engine possessing much originality is Atkinson's.



HORIZONTAL OTTO GAS ENGINE
(Nearer Fly-Wheel is omitted to show detail)

GAS FURNACE, a small furnace, much employed for laboratory purposes, and which is so arranged as to receive the maximum heating powers of the gas without regard to its illuminating purposes. Various forms have been contrived. Also a furnace of which the fuel is gas from burners suitably disposed in the chamber for the purpose required. Steam boilers and metallurgic furnaces are sometimes heated in this manner.

GASKELL, MRS., an English novelist; born in Chelsea, London, England, Sept. 29, 1810. Her maiden name was Elizabeth Cleghorn Stevenson, and her father was in succession teacher, preacher, farmer, boarding-house keeper, writer, and Keeper of the Records to the Treasury. She was brought up by an aunt at Knutsford—the Cranford of her story, and was carefully educated. She married in 1832 William Gaskell (1805-1884), a Unitarian minister in Manchester. In 1848 she published anonymously her "Mary Barton," which at once arrested public attention. It was followed by "The Moorland Cottage" (1850); "Cranford" (1853); "Ruth" (1853); "Life of Charlotte Brontë" (1857); "Right at Last" (1860); "Sylvia's Lovers" (1863); and "Wives and Daughters" (1865). She died in Alton, Hampshire, England, Nov. 12, 1865.

GAS METER, a machine for measuring the quantity of gas passing through it. Citizen Seguin described a gas meter at the sitting of the National Institute of France, Oct. 6, 1797. The wet meter was invented by Clegg in 1807, and improved by Crosley in 1815. The dry meter was invented by Malam in 1820, and improved by Defries in 1838.

GAS, NATURAL. See NATURAL GAS.

GASOLINE, a light grade of PETROLEUM (*q. v.*).

GASPÉ (gäs-pā), a peninsula on the E. of Quebec province, comprising the counties of Gaspé and Bonaventure, and projecting into the Gulf of St. Lawrence, between the estuary of that name on the N. and the Bay of Chaleurs on the S.; area 8,000 square miles; Pop. 64,000. The greater number of the population are engaged in the important fisheries, which, with the export of lumber, form the staple business of the country. GASPÉ BASIN, where Cartier landed in 1534, is a port of entry in Gaspé Bay, now the seat of extensive fisheries.

GAS PUDDLING, in iron-works, the puddling of iron by the use of gases instead of solid fuel.

GASQUET, CARDINAL FRANCIS AIDAN. A French prelate. He was born in London in 1846 and was educated at Downside College, Bath, becoming after the usual course priest and member of the Benedictine order. In 1878 he was appointed superior of the Benedictine Monastery and College of St. Gregory, Downside, and in 1914 was made cardinal and intrusted by Pope Pius X. as president with overseeing the International Commission for the Revision of the Vulgate. For the purpose of that work he has since lived in Rome. His works include: "Edward VI. and the Book of Common Prayer"; "The Great Pestilence"; "The Old English Bible and Other Essays"; "Eve of the Reformaiton"; "English Monastic Life"; "Parish Life in Mediæval England."

GASTEIN (gäs'tīn), a romantic valley in the S. of the Austrian duchy of Salzburg, 28 miles long, with a number of small villages. The chief of these, Wildbad-Gastein, is a famous watering-place, and was a favorite resort of the Emperor William I. of Germany. Here, Aug. 14, 1865, a convention was signed between Austria and Prussia, which, by a partition of Schleswig and Holstein, for a short period prevented the rupture between the rival powers. Pop. of the valley about 5,000.

GASTEROPODA (-op'ō-dä), in zoölogy, gasteropods; the most typical, though not the most highly-organized class of the sub-kingdom *Mollusca*. Its essential character is that the under side of the body constitutes a single muscular foot, on which the animal creeps or glides. Most of the gasteropoda have univalve shells, a few have them tubular or conical; in one the shell is multivalve, and in some it is internal or wanting. Most of the spiral shells are dextral, a few are sinistral. Some have an operculum closing the aperature of the shell. The animal has a head furnished with two, four, or six tentacles, or these are wholly wanting. There is a mantle, in the folds of which the shell is produced. Some breathe air, the others water. Cuvier divided the gasteropoda into eight orders (1) *Pectenibranchiata*, (2) *Scutibranchiata*, (3) *Cyclobranchiata*, (4) *Tabulibranchiata*, (5) *Pulmonata*, (6) *Tectibranchiata*, (7) *Inferobranchiata*, (8) *Nudibranchiata*. Woodward and others have divided the class into four orders only. (1) *Prosobranchiata*, including the first four of Couvier's orders, (2) *Pulmonata*, corresponding to his 5th, (3) *Opisthobranchiata*, comprehending his 6th, 7th, and 8th orders; and (4) *Nucleobranchiata*, which Cuvier had made a distinct class—*Heteropoda* (*q. v.*). The *Prosobranchiata* have been arranged in two divisions: *Siphonostomata*, and *Holostomata;* and the *Opisthobranchiata* also in two: *Tectibranchiata* and *Nudibranchiata*.

In palæontology, gasteropoda are found in all the formations from the Upper Cambrian rocks till now.

GASTON DE FOIX (gäs-tôn de fwä), a Duke of Nemours, a French soldier; born in 1489. He was son of John de Foix, Count d'Estampes, and Mary of Orleans, sister of Louis XII. whose favorite he became. At the age of 23 he routed a Swiss army, rapidly crossed four rivers, drove the Pope from Bologna, and won the celebrated battle of Ravenna, April 11, 1512, but was killed while attempting to cut off a body of retreating Spaniards.

GASTONIA, a city of North Carolina, the county-seat of Gaston co. It is on the Southern, the Piedmont and Northern and the Carolina and Northwestern railroads. Its industries are of great importance and include cotton mills, oil works, manufactures of cotton-mill machinery, brooms, cement, wood fiber, etc. Pop. (1910) 5,759; (1920) 12,871.

GASTRIC JUICE, a colorless liquid secreted by the stomach containing about 98.5 percent. of water; when evaporated to dryness and burnt, the ashes consist chiefly of sodium chloride. The gastric juice also contains a free acid, probably hydrochloric acid, and a peculiar substance called PEPSINE (*q. v.*), to which, and the presence of the free acid, the power of digesting food possessed by the gastric juice appears to be due.

GASTRITIS (-trī'tis), inflammation of the stomach, either acute or chronic, usually most severe at the pyloric orifice, generally caused by corrosive or irri-

tant poisons, but chiefly from the use of raw spirits, accompanied by nausea, sickness, etc., and in severe cases followed by congestion. It seldom occurs in persons of temperate habit.

GATACRE, SIR JOHN, an English soldier, born at Shropshire, in 1841. He was educated in private schools and entered the military service as an ensign in 1857. He served for many years in India and was commandant of the 23d Regiment until 1891. He was made Brigadier-General in the same year, and Major-General in 1897. He took part in the Indian Mutiny and in the China War of 1860. He also served in other expeditions and was decorated for gallantry in the service.

GATE, in carpentry, a sash or frame in which a saw is extended to prevent buckling or bending. In locksmithing, one of the apertures in the tumbler for the passage of the stub. In founding: (1) An ingate, the aperture in a mold through which the metal is poured. The runner conducts the metal from the ingate to the hollow in the mold, where it forms a casting. The piece of metal which occupies the ingate and runner is called a sprue, and is knocked off the casting. (2) The sprue or piece of metal cast in the gate; a sullage piece. In hydraulic engineering: (1) The valve which admits the water to the bucket of the water wheel. (2) A sluice, admitting or shutting off water to or from a lock or dock. To stand in the gate or gates, in Scripture, to occupy a position of advantage, defense, or honor.

GATES, HORATIO, an American military officer; born in Maldon, England, in 1728; joined the British army early in life. In 1755 he was assigned to duty at Halifax, N. S. He was shot through the body at the Monongahela river while with Braddock's expedition. In July, 1775, after offering his services to Congress, that body appointed him adjutant-general; in 1776 he was given command of a portion of the Northern army, and, Aug. 2, 1777, assumed command of the Northern department. He met and captured Burgoyne with his whole army at Saratoga, Oct. 7, 1777, for which he received a gold medal and a vote of thanks from Congress. In November of the same year he was appointed president of the new board of war and ordnance; and in 1778, while holding that post, sought with the aid of his friends in Congress to supersede Washington as commander-in-chief. This action soon brought him into discredit, and after fighting a duel with Wilkinson, his former adjutant, he resigned from active service. In June, 1780, he again entered the army, becoming commander of the troops in North Carolina. On Aug. 16, of that year, his army was defeated near Camden, S. C. He was soon afterward suspended from duty, but reinstated in his command in 1782 after the capture of Cornwallis. He died in New York City, April 10, 1806.

GATES, MERRILL EDWARDS, an American publicist and educator, born in Warsaw, N. Y., in 1848. He graduated from the University of Rochester in 1870. After teaching in private schools until 1882 he became president of Rutgers College, serving until 1890, when he was chosen president of Amherst College. In 1899 he was appointed secretary of the United States Board of Indian Commissioners, serving until 1912. He was for 6 years president of the Lake Mohonk Indian Conference, and was prominently identified with Y. M. C. A. work. He was the author of "International Arbitration" (1897); "Highest Use of Wealth" (1901). He lectured extensively on religious and ethical subjects.

GATES, SIR THOMAS, a colonial governor of Virginia. He sailed from England in May, 1609, in charge of a colony of 500 emigrants to the New World. His vessel, the "Sea Venture," was stranded on the rocks of Bermuda. Here the passengers built two new ships and finally reached Virginia in May, 1610. Gates went to England in the meantime and returned in 1611 with 300 more emigrants. He was made governor the same year and held that office till 1614, when he returned to England, and there died in 1621, or soon after.

GATH, one of the five royal cities of the Philistines, which, from its situation on the borders of Judah, was of much importance in the wars of the Jews and Philistines. It was the native town of Goliath, and was successively captured by David, Hazael, and Uzziah, who dismantled it.

GATHMANN GUN, a gun invented by Louis Gathmann, a Chicago mechanician and inventor, which is capable of throwing great masses of high explosives by means of gunpowder. It is a rifled cannon, unjacketed, and with no re-enforcements at the breech. Its bore is 13 inches, 1 inch larger than in any cannon heretofore made by the government. The shell is 7 feet long and contains 400 pounds of wet guncotton. There is a plunger at the end which, when it strikes an object, explodes the percussion cap which sets fire to some dry powder, that in turn sets off some dry guncotton, which on bursting lets loose the terrible

force imprisoned in the 400 pounds of wet guncotton. See ORDNANCE.

GATINEAU (gä-ti-nō′), a river of Canada, Quebec Province, the largest affluent of the Ottawa, rising in some lakes, and flowing almost due S. to enter the Ottawa nearly opposite Ottawa City. It is not navigable more than 5 miles above the Ottawa except by canoes, but its rapid waters are well stocked with fish and available as water powers.

GATLING, RICHARD JORDAN, an American inventor; born in Hertford co., N. C., Sept. 12, 1818. While a boy he assisted his father in perfecting a machine for sowing cotton seed, and another for thinning out cotton plants. Subsequently he invented a machine for sowing rice. Removing to St. Louis, in 1844, he adapted this invention to sowing wheat in drills. For several winters he attended medical lectures in Cincinnati, and in 1849 removed to Indianapolis, where he engaged in railroad enterprises and real estate speculations. In 1850 he invented a double-acting hemp brake, and in 1857 a steam plow, which, however, he did not bring to any practical result. In 1861 he conceived the idea of the revolving battery gun which bears his name. Of these he constructed six at Cincinnati, which were destroyed by the burning of his factory. Afterward he had 12 manufactured elsewhere, which were used by General Butler on the James river. In 1865 he improved his invention, and in the year following, after satisfactory trial, it was adopted into the United States service. It has also been adopted by several European governments. Died Feb. 23, 1903.

GATLING GUN, a machine gun, invented by Richard J. Gatling. The gun consists of a series of barrels in combination with a grooved carrier and lock cylinder. The main features of the gun are: (1) Each barrel in the gun is provided with its own independent lock or firing mechanism. (2) All the locks revolve simultaneously with the barrels, carrier and inner breech, when the gun is in operation. The locks also have a reciprocating motion when the gun is rotated. The gun cannot be fired when either the barrels or locks are at rest.

GATSHINA, a town of Russia, 30 miles S. S. W. of Petrograd. It has some manufactures of porcelain, and several barracks, but is especially worthy of mention for its royal palace, surrounded by one of the finest pleasure gardens in Europe, which were the favorite summer seat of the Emperor Paul I., and the winter residence—practically, owing to precautions against Nihilists, the prison—of Alexander III.

GATTI-CASAZZA, GIULIO, an Italian operatic manager, born in Udine, Italy, in 1869. He graduated as a naval engineer at the Polytechnic College of Genoa. From 1892 to 1898 he was director of the Municipal Theater at Ferrara, and from 1898 to 1908 was director of the Teatro Alla Scala in Milan. In the same year he was appointed director of the Metropolitan Opera House. In 1910 he married Frances Alda, an operatic soprano.

GAUCHO (gou′chō), a native of the pampas of La Plata, and of Spanish descent. The Gauchos live by cattle-breeding, and are noted for their skill in horsemanship and the use of the lasso and the bolas.

GAUGE, a standard of measurement. As applied to railways, gauge signifies the distance between the centers of each pair of rails, which in the ordinary or narrow gauge is 4 feet 8½ inches. The broad gauge of the Great Western Railway of England was formerly 7 feet; the Irish, Indian, and Spanish gauge is 5 feet 6 inches. Special narrow gauges have recently been adopted for mountain and mineral lines, such as the 3 feet 6 inch gauge of the Norwegian lines. Gauge is also the name applied to various contrivances for measuring any special dimension, such as the wire gauge, an oblong plate of steel, with notches of different widths cut on the edge, and numbered, the size of the wire being determined by trying it in the different notches till one is found which it exactly fits. The thickness of sheet metal is tried by a similar gauge.

GAUGE, PRESSURE, an instrument for indicating the intensity of a fluid contained in a closed vessel. Gauges are divided into three classes: the mercurial pressure gauge, the air manometer, and the spring gauge. The mercurial gauge consists of an inverted siphon or "U" tube of glass, the lower part of which contains mercury, and whose vertical legs are divided either in parts of an inch or divisions indicating pounds per square inch. One leg of the tube is open to the atmosphere and the other communicates with the vessel containing the fluid. The difference in level of the mercury indicates the difference in pressure between the atmosphere and the fluid. The air manometer consists of a long vertical glass tube closed at the upper end, open at the lower end, containing air and immersed in a transparent liquid

which communicates with the vessel in which the pressure is to be determined. The compression of the air in the tube is proportional to the pressure. Spring gauges have metallic tubes or drums communicating with the closed vessel. The pressure tends to straighten the tube. The motion produced in the tube or drum is transmitted to a pointer by means of levers or other gearing. The pointer travels over a graduated arc from which the pressure is read directly.

GAUL, or **GALLIA**, the country of the ancient Gauls. It extended at one time from the Pyrenees to the Rhine, and included also a part of Italy. Hence it was divided into Gaul on this side (the Roman side) of the Alps, or Gallia Cisalpina, and Gaul beyond the Alps, or Gallia Transalpina. Latterly the former was regarded quite as part of Italy, and the name Gallia was restricted to Transalpine Gaul, or the country nearly corresponding to modern France. Julius Cæsar, about the middle of the 1st century B. C., found Transalpine Gaul divided into three parts: (1) Aquitania, extending from the Pyrenees to the Garonne, chiefly occupied by Iberian tribes; (2) Gallia Celtica, Celtic Gaul, from the Garonne to the Seine and Marne; (3) Gallia Belgica, Belgic Gaul, in the N., extending to the Rhine.

GAUL, ALFRED ROBERT, an English composer and organist; born in Norwich, England, in 1837. He was chorister and assistant organist of Norwich Cathedral 1846-1859; organist of St. Augustine's Church, Edgbaston, Birmingham; Mus. B., Cambridge, 1861. An oratorio, "Hezekiah," the cantatas "Ruth" (1881), First Psalm, Ninety-sixth Psalm, "Holy City" (1882), "Passion Music," "The Ten Virgins" (1890), dedicated to the choirs of America, and secular part songs attained success. He died in 1913.

GAULS, the chief branch of the great original stock of Celts. Migrations among the Gauls about 397 B. C., and their passage of the Alps, first bring the Gallic nation into the region of history. Having crossed the Alps they fell on the Etruscans, defeated the Romans at Allia (390 B. C.), and sacked and burned Rome, the capitol, however, being saved by Camillus. More than a century after the burning of Rome, the E. Gauls, in 280-278 B. C., made three destructive irruptions into Macedonia and Greece. Several tribes pursued their course into Asia Minor, where, under the name of Galatians, they long retained their national peculiarities. After these migrations the Gauls along the banks of the Danube and in the S. of Germany disappear. Tribes of German origin occupy the whole country as far as the Rhine, and even beyond that river. The Belgæ, who were partly German, occupied the N. part of Gaul, from the Seine and Marne to the British Channel and the Rhine, from whence colonists passed over into Britain, and settled on the coast districts. The Celts in Gaul had attained some degree of cultivation by intercourse with the Greeks and Carthaginians before they came in contact with the Romans. Those of Cisalpine Gaul continued formidable to Rome till after the first Punic war, when the nation was compelled as the result of a war of six years to submit to the Romans (220 B. C.). When Hannibal marched on Rome they attempted to shake off the yoke; but the Romans, victorious over the Carthaginians, reduced them again to submission. Thirty-one years later (189 B. C.) their kindred tribe in Asia, the Galatians, met with the same fate; they also were vanquished, and their princes (tetrarchs) became tributary. In the years 128-122 B. C. the Romans conquered the S. part of Gaul along the sea from the Alps to the Pyrenees, and here established their dominion in what was called the Province (Provincia), a name that still exists as Provence. Not long after Gaulish tribes shared in the destructive incursions of the Cimbri and Teutones on the Roman territory, which were ended by Marius in the battles of Aquæ Sextiæ (Aix) in 102, and Vercelli in 101 B. C. On the appointment of Julius Cæsar to the proconsulship over the countries bordering on Gaul, he resolved to subject all Gaul, and executed his purpose in less than nine years (58-50 B. C.). in eight bloody campaigns. The dominion of the Romans in Gaul was confirmed by colonies, and the liberal grant of the Roman citizenship to several Gallic tribes. The religion of the Druids, being suppressed in Gaul by Tiberius and Claudius, gradually retreated into Britain, soon also conquered by the Romans. After the extinction of the Cæsars, the Gauls once more attempted to recover their liberty by aid of the Germans, but after this last effort became entirely Romanized, even their ancient language, the Celtic, being supplanted by a corrupt Latin dialect. About the year 486 the Franks subdued the greater part of Gaul, and put an end to the dominion of the Romans in that country.

GAUSS, KARL FRIEDRICH (gous), German mathematician and astronomer; born in Brunswick, Germany, April 30, 1777. Aided by the Duke of Brunswick,

he studied at Brunswick and Göttingen. Here he made several of his greatest discoveries in analysis, which induced him to make the cultivation of science the chief object of his life. He published "Arithmetical Disquisitions" in 1801. In 1807 he received the appointment of ordinary professor and director of the observatory at Göttingen, which situation he held for nearly 48 years. He gave to the world a host of treatises on pure mathematics, geodesy, astronomy, and the cognate sciences, besides making observations on terrestrial magnetism which have proved of great utility to the cultivation of science. He died in Göttingen, Germany, Feb. 23, 1855.

GAUTAMA, (gou'ta-ma), the family name of the founder of BUDDHISM (*q. v.*).

GAUTIER, THÉOPHILE, a French poet and prose writer; born in Tarbes, France, Aug. 31, 1811. He studied at the College Charlemagne, Paris, and at first tried painting, but turned to literature. In verse he published: "Albertus" (1830); "Comedy of Death" (1832); "Enamels and Cameos" (1856); his best poetry; etc. Of novels and short stories he wrote "Young France" (1833); "Mademoiselle de Maupin" (1835); "Fortunio" (1838); "A Tear of the Devil" (1839); "Militona" (1847); "The Tiger's Skin" (1852); "Jettatura" (1857); "Captain Fracasse" (1863); "Handsome Jenny" (1865); "Spirite" (1866); etc. For more than 30 years he contributed to the Paris newspapers criticisms on the theater and the salon. He wrote "Journey in Spain" (1843); "Zigzags" (1845); "Constantinople" (1854); "Journey in Russia" (1866); etc. "The Grotesque" (1844), on the writers of the 16th and 17th centuries; "Balzac" (1858); "Private Menagerie" (1869), biographical; "History of Romanticism" (1872) "Literary Portraits and Souvenirs" (1875); "The East" (1877), the last two being posthumous. He died in Paris, Oct 23, 1872.

GAUZE, a light, transparent silk or cotton stuff. Gauzes have been occasionally made of thread, but the name has always signified a silk fabric.

GAVARNIE (gä-vär-nē'), **CASCADE DE**, a waterfall in the Cirque de Gavarnie, Pyrenees. It is the second highest in Europe, being 1,385 feet in height.

GAVARNIE, CIRQUE DE (sērk de), a natural amphitheater in the Pyrenees, 14 miles S. S. E. of Cauterets. It is 2¼ miles in width and 5,380 feet in height.

GAVESTON, PIERS (gä-ves-tôn), the favorite of Edward II., King of England. He was a Gascon by birth, and on account of his father's services to Edward I. was chosen companion to the Prince of Wales, over whom he acquired a complete and very mischievous ascendency, and breeding dissension between him and his father. Edward I. banished him in 1307, but dying the same year, Edward II. at once recalled him, made him Earl of Cornwall, and gave him in marriage his niece, Margaret de Clare. Intoxicated with his elevation and honors he exasperated the nobles. He was again banished, again recalled, and, the barons having declared war, was besieged in Scarborough castle, captured, and executed near Warwick, June 19, 1312.

GAVOTTE, or **GAVOT** (gā-vot'), originally a dance of the gavots or people of Gap, in the department of the Upper Alps. Origin: French. The description of the dance, "a brisk round for as many as will," identifies it with the country dance. The gavotte seems to have been more popular as an instrumental piece than as a dance, and to have been a favorite movement in suites lessons, and sonatas from the latter part of the 17th century.

GAY, JOHN, an English poet; born near Barnstaple, Devonshire, England, in 1685. He was apprenticed to a silk mercer in London. In 1713 he published his "Rural Sports." In 1712 he became secretary to Anne, Duchess of Monmouth. "Trivia, or the Art of Walking the Streets of London," appeared in the same year. In 1714 his caricature of Ambrose Philips's pastoral poetry was published, "The Shepherd's Week." He was appointed secretary to the Earl of Clarendon, in his embassy to the court of Hanover. In 1715 appeared his burlesque drama of "What d'ye Call it?" "Three Hours after Marriage," a farce, altogether failed. In 1720 he published his poems by subscription, in 1723 his tragedy, "The Captives," and in 1726 his well-known "Fables." His "Beggar's Opera," the notion of which seems to have been afforded by Swift, was first acted in 1727, at Lincoln's Inn Fields, where it ran for 63 nights, but the lord-chamberlain refused to license for performance a second part entitled "Polly." The latter part of his life was spent in the house of the Duke of Queensberry, where he wrote his sonata "Acis and Galatea" and the opera "Achilles." He died in London, Dec. 4, 1732.

GAY, WALTER, an American artist; born in Hingham, Mass., Jan. 22, 1856; was educated in Boston; studied art under Bonnat in Paris, where he was in frequent exhibitions. His paintings,

which won many medals, include "Benedicite" (Bless ye), now in the Museum of Amiens, France, "Las Cigarreras" (The Cigarette Sellers), in the Luxembourg, Paris; and canvases in the Metropolitan Museum of Fine Arts, New York, the Museum of Fine Arts, Boston, and several noted collections in Europe. The French Government made him a Chevalier of the Legion of Honor in 1894, and an officer of the order in 1906.

GAYA (gī'ä), the chief town of Gaya district, in Bengal, India, on the Phalgu, 57 miles S. of Patna. It is a place of the greatest sanctity, from its associations with the founder of BUDDHISM (*q. v.*), and is annually visited by about 100,000 Hindu pilgrims, who, under the guidance of the Brahman priests, pray for the souls of their ancestors at the 45 sacred shrines within and without the walls. Pop. about 50,000.

GAY HEAD, a promontory and lighthouse on the S. W. extremity of Martha's Vineyard, Mass.

GAY-LUSSAC, JOSEPH LOUIS (gā-lü-säk'), a French physicist; born in St. Leonard, Haute-Vienne, France, Dec. 6, 1778. In 1804 he was the first to make balloon ascensions for purposes of scientific investigation; became a member of the society of Arcueil, and was introduced to Humboldt, with whom he prosecuted an investigation of the polarization of light and other subjects. To him we are indebted for the discovery of the hydro-sulphuric and oxy-chloride acids. In 1830 he became a member of the Chamber of Deputies, and in 1839 was created a peer of France. He was Professor of Chemistry at the Jardin du Roi. He died in Paris, May 9, 1850.

GAYNOR, WILLIAM JAY, an American lawyer and public official; born at Whitestown, Oneida co., N. Y., in 1851; educated in the local seminary and at the Christian Brothers' College, St. Louis, Mo. Employed for a time as a teacher in Boston, he subsequently removed to Brooklyn, N. Y., became a reporter and studied law. In 1875 he was admitted to practice and quickly identified himself with the reform party in Flatbush. Elected Police Commissioner of that village, his activities against corrupt politics soon made him a prominent figure in municipal affairs. After serving two terms as Supreme Court Justice, he was elected Mayor of New York City in 1909, with the support of Tammany Hall. Shot, Aug. 9, 1910, while boarding an ocean liner, he never fully recovered from the wound and succumbed to the strain of his campaign for re-election, Sept. 10, 1913.

GAZA (gā'zä), one of the five chief cities of the ancient Philistines, situated in the S. W. of Palestine, about 3 miles from the sea, on the borders of the desert which separates Palestine from Egypt. It is often mentioned in the history of Samson, and was the scene of constant struggles between the Israelites and the Philistines. In 333 B. C. it was taken after a five months' siege by Alexander the Great, and from that time down to 1790, when the French under Kleber captured it, it witnessed the victories of the Maccabees, the Calif Abubekr, the Templars, and the heroic Saladin. Constantine the Great, who rebuilt the town, made it the seat of a bishop. The modern Guzzeh is a collection of mere villages. It was occupied by British forces Nov. 7, 1917, in the advance on Palestine.

GAZALAND, a district in the Portuguese possession in east Africa, lying to the eastward of the Transvaal and watered by the Limpopo river. The Portuguese obtained their first foothold here in 1830. In 1833 they were almost driven out by an uprising of the natives, all their trading posts being captured. Gradually the country was securely occupied and the district enlarged, notably in 1884, after the death of the friendly chieftain, Umzila. In 1890 a war was waged with the forces of the British South African Company, with the final result of a boundary settlement in the interior in favor of the Portuguese. After 1906 the Portuguese occupation was more firmly established by the death of the chief of the unruly elements among the natives, Gungunyana.

GAZELLE, a kind of antelope, *Gazella dorcas*, formerly called *Antilope dorcas*. From the large bright eyes of the animal and its general gracefulness, it was sometimes used for a Greek female name, as in the case of Dorcas, who made garments for the poor (Acts ix: 36—end). The horns are rounded, thick, and black; the hair on the body light yellow on the back, while on the lower parts a broad band exists along each flank, a bunch of hairs on each knee, and a deep pouch at each groin. It lives in north Africa.

GEAR, in machinery, the furniture, rigging, tackle (jeers), apparatus, and appurtenances of an implement: *e. g.*, expansion gear, valve gear, pump gear, plow gear; the working parts of a locomotive; the rigging of a spar or sail; the running parts of a wheeled vehicle, as the fore gears, hind gears, referring to the fore axle and its wheels, the hind axle and its wheels. To the former is attached the tongue and fore hounds, to the latter the hind hounds. Each carries

its bolster. The term is also applied to other mechanical devices by which motion is transmitted; as change gear, chain gear, back gear, overhead gear; or by which parts are operated, as hoisting gear.

GEARING, a train or series of wheels with cogs for transmitting motion; the parts in machinery by which motion is communicated. In spur gearing the teeth are arranged round either the concave or convex surface of a cylindrical wheel in the direction of radii from the center of the wheel, and are of equal depth throughout. In beveled gearing the teeth are placed upon the exterior periphery of a conical wheel in a direction converging to the apex of the cone, and the depth of the teeth gradually diminishes from the base.

GEASHILL, a parish of Ireland, in Kings county; about 8 miles N. W. of Portarlington. It contains the ruins of a castle heroically defended during the civil war of 1641 by Lady Digby.

GEASTER, or **GEASTRUM** (so called from the stellate appearance of the species when burst and lying on the ground), in botany, earth stars; a genus of gasteromycetous fungi, sub-order *Trichogastres*. It was formed by Micheli to include the puffballs, having a stellated volva. They are small fungi, often of a brown color. *G. hygrometricus*, as the name implies, readily absorbs and retains moisture.

GEBA, a Levitical town of Benjamin, situated 6 or 7 miles from Jerusalem, and not far from the N. border of the kingdom of Judah. Near Geba David defeated the Philistines (II Sam. v: 25).

GEDDES, SIR AUCKLAND CAMPBELL, a British statesman. He was born in 1879 and received his preliminary education at George Watson's College, Edinburgh. He studied medicine at Edinburgh University, London Hospital, and Freiburg, and after graduating became demonstrator and assistant professor of anatomy at Edinburgh University. Later he was professor of anatomy at the Royal College of Surgeons, Dublin, and also at McGill University, Canada. He served in the war against the Boer republic and also in the World War, 1914-16. During 1916-17 he was Director of Recruiting in the War Office, and in 1917, 1918, and 1919 was Minister of National Service, becoming also, in 1917, Unionist member in Parliament for the Basingstoke and Andover division of Hampshire. He was knighted in 1917, became President of the Local Government Board in 1918, and President of the Board of Trade and Minister of Reconstruction in 1919. In the beginning of 1920 he became British Ambassador in Washington.

GEDDES, SIR ERIC (CAMPBELL), an English public official. He was born in India in 1876 and was educated at Oxford Military College and Merchiston Castle School, Edinburgh. After leaving school he engaged in lumbering in the Southern States of America and was an employee of the Baltimore and Ohio railway. Later he was connected with the Rohilkund and Kumaon railway, India, and returning to England became deputy general manager of the North Eastern



SIR ERIC GEDDES

railway. During the World War he became Deputy Director-General of Military Railways and Inspector-General of Transportation. In 1917, he became honorable Major-General, additional member of the Board of Admiralty, Navy Controller, and Temporary Honorable Vice-Admiral. In 1918 he was a member of the Imperial War Cabinet and First Lord of the Admiralty. He has been member of Parliament for Cambridge since 1917 and Minister without portfolio since 1919.

GEELONG, a city of Victoria, Australia; on Corio Bay, 45 miles S. W. of Melbourne. It is well laid out, and has some handsome buildings. The gold discoveries in 1851 brought it prosperity.

Limestone and a kind of marble are found in the neighborhood. The industries are the manufacture of woolen cloths and paper, meat preserving, tanning, rope making, fishing, etc. It has two parks, botanical garden, government buildings, a town hall, a new postoffice (1889), an excellent hospital, a chamber of commerce, mechanics' institute, etc. Corio Bay is a favorite bathing resort; and on the E. boundary of the town are extensive limestone quarries. Pop., including suburbs (1918), 34,080.

GEELVINK BAY (gāl'vink), an arm of the Pacific, penetrating 125 miles S. into the W. arm of New Guinea. Its entrance, about 155 miles wide, is protected by several islands; its shores are well wooded, flat and fertile, but unhealthy. The bay is separated by a narrow isthmus from the Alfura Sea on the S., and by a still narrower isthmus from McClure Gulf on the W.

GEESTEMÜNDE (gās'te-mün-de), a seaport of Prussia, at the confluence of the Geeste with the Weser; immediately S. E. of Bremerhaven. It owes its importance to the docks and wharves constructed in 1857-1863. It has also a school of navigation; imports petroleum, tobacco, rice, coffee, timber, and corn; and carries on various industries connected with shipping.

GEFLE (yāf'lā), chief town of the Swedish län of Gefleborg; on the Gulf of Bothnia, 71 miles N. by W. of Upsala. The port for Dalecarlia, Gefle ranks third among the commercial towns of Sweden, coming next to Stockholm and Gothenburg. Among the noteworthy buildings are the castle (16th and 18th century) and the town hall. Gefle, which has been rebuilt since its destruction by fire in 1869, has a school of navigation, and carries on shipbuilding, the manufacture of sail-cloth, cotton, and tobacco, and fisheries. It carries on an active trade, the principal exports being iron, timber, and tar. Pop. about 32,000.

GEHENNA (gē-hen'ä) (Hebrew *Ge Hinnom*, the Valley of Hinnom), in Scriptural geography a valley anciently belonging to a man, Hinnom, of whom nothing is known (Josh. xviii: 16), and inherited by his son or sons, whence it is called the Valley of the Son of Hinnom (Josh. xv: 8), or of the children of Hinnom (II Kings xxiii: 10). In Joshua it is described as lying S. of Jebusi, the Jebusite capital, which afterward became Jerusalem (xviii: 16). Here, during the later period of the Jewish kings, men made their sons and daughters pass through the fire to Molech or Moloch, the Ammonite fire-god (II Kings xxiii: 10; II Chron. xxxiii: 6), or actually burnt them in the fire (II Chron. xxviii: 3). Tophet was in it (II Kings xxiii: 10), and a prophetic passage mentions the size and fierceness of the fires there burning for the "King" [Molech means king] (Isaiah xxx: 33). Josiah put an end to these cruel practices, and defiled the place (II Kings xxiii: 10). It was doomed afterward to become an overcrowded cemetery (Jer. vii: 32). When the Jews outgrew all love of human sacrifice, they regarded the place with horror, the rabbis deeming it the gate of hell. The valley, which the Arabs call Gehennam, is thoroughly known. It is narrow and deep, with rugged limestone cliffs excavated for tombs, and the mountain sides overtopping all.

For the Gehenna of Scripture, see HELL.

GEIKIE, SIR ARCHIBALD (gē'ki), a Scottish geologist; born in Edinburgh, Scotland, Dec. 28, 1835. He was educated at the high school and university. In 1855 he was appointed to the Geological Survey; in 1867 became director to the survey in Scotland; from 1870 to 1881 was Murchison Professor of Geology in Edinburgh University; and in 1881 was appointed director-general to the survey of the United Kingdom, being at the same time placed at the head of the Museum of Practical Geology, London. He is the author of "Story of a Boulder" (1858); "Phenomena of the Glacial Drift of Scotland" (1863); "The Scenery of Scotland Viewed in Connection with Its Physical Geology" (1865; 2d ed. 1887); "Memoir of Sir R. Murchison" (1874); "Text-book of Geology" (1882); "The Founders of Geology" (1897); "Types of Scenery" (1898); etc., besides numerous class-books, primers, etc., on geology.

GEIKIE, JAMES, a Scottish geologist; born in Edinburgh, Scotland, Aug. 23, 1839. He received an education similar to that of his brother Archibald. Having served on the Geological Survey of Scotland from 1861 to 1882, he succeeded his brother as Murchison Professor of Geology in Edinburgh University. He is the author of "The Great Ice Age" (2d ed. 1877); "Prehistoric Europe" (1881); "Outlines of Geology" (1886; 2d edition 1888); a translation of "Songs and Lyrics by H. Heine and other German Poets" (1887); "Earth Sculpture" (1898); "Mountains" (1913); "Antiquity of Man in Europe" (1913). He died in 1915.

GELA (jē'lä), one of the most important ancient Greek cities of Sicily, sit-

uated on the S. coast of the island between Agrigentum and Camarina; founded in 690 B. C. by a colony of Cretans and Rhodians. The colony was remarkably prosperous, and in 528 B. C. sent out a portion of its inhabitants, who founded Agrigentum. In 280 Phintias, the tyrant of Agrigentum, utterly destroyed Gela.

GELASIUS II., Bishop of Rome (1118-1119), formerly John of Gaeta. He was educated at the Benedictine abbey of Monte Cassino, was cardinal and chancellor under Urban II. and Paschal II., and on the death of the latter was chosen Pope by the party hostile to the Emperor Henry V. The imperial party at Rome under the Frangipani seized his person, but were forced to set him free by the menacing attitude of the mob. The new Pope fled before the advancing imperial troops to Gaeta, where he first received his consecration, and whence he fulminated the thunders of excommunication against Henry V. and Gregory VIII., the antipope he had set up. Soon after he was able to return to Rome, but ere long had to betake himself for protection to France, where he died in the monastery of Clugny, Jan. 29, 1119.

GELATINE, or **GELATIN** (Latin, *gelatus*=frozen, so named from the tendency which the substance has to congeal and become to a certain extent solid), in chemistry, $C_{75}H_{124}N_{24}O_{29}$.? Animal glutin, obtained by treating bones with dilute hydrochloric acid, which dissolves the mineral constituents of the bone, consisting of phosphates and carbonates of calcium, magnesium, etc., and leaves the bone cartilage. This, when boiled for a long time with water, dissolves, and forms gelatine, which can be purified by dissolving in hot water and precipitating by alcohol. A pure variety is obtained from the swimming bladder of the sturgeon, or other species of *Acipenser*. Impure gelatine, called glue, is prepared by boiling down pieces of hide, horn, hoof, cartilage, etc., with water under pressure. Pure gelatine is amorphous, transparent in thin plates, of a yellowish-white color; it has neither taste nor smell, and is neutral to vegetable colors; it is insoluble in alcohol and in ether. In contact with cold water it swells up, and is soluble in hot water. Gelatine subjected to dry distillation yields methylamine, cyanide of ammonium, pyrrol, etc.; by oxidation with sulphuric acid and manganese dioxide, or with chromic acid mixture, it yields hydrocyanic acid, acids of the fatty series, benzoic aldehyde and benzoic acid, etc. Gelatine boiled with caustic potash yields glycocine and leucine. Gelatine contains about 50 per cent. of carbon, 6.6 of hydrogen, and 18.4 of nitrogen; when pure it probably contains no sulphur.

GELATIN PROCESS, the name given to the preparation of a photographic dry-plate by covering with an emulsion of sensitive salts in warm gelatin, and then drying. The plates are very much more sensitive than the old-fashioned wet plates, and have therefore made possible the photographing of rapidly moving objects. The exact composition of the gelatin emulsions varies considerably, and is kept secret by the different manufacturers, but generally speaking, the chemicals used in their manufacture include silver nitrate, ammonium bromide, potassium bromide and potassium iodide.

GELNHAUSEN (geln'hou-zen), a town of Prussia, on the Kinzig river, and on the slopes of a vine-clad hill, 26 miles N. E. of Frankfort-on-the-Main. Here, on an island in the Kinzig, Frederick Barbarossa built an imperial residence ("the Pfalz"); and in 1169 he conferred on the village the freedom of the empire. After being transferred to the counts of Hanau in 1435, Gelnhausen began to decay.

GELSENKIRCHEN (gel'zen-kēr-chen), a modern manufacturing town of Westphalia, 4 miles N. W. of Bochum. It owes to coal and iron its rise from a mere village since 1860. Pop. about 170,000.

GEM, a precious stone. Gems are sometimes found crystallized in regular shapes and with a natural polish, more commonly of irregular shapes and with a rough coat. The term gem often denotes more particularly a stone that is cut, polished, or engraved, and it also includes pearls and various artificial productions. The first and most valuable class of gems includes diamonds, emeralds, rubies, sapphires, and a few others; the second class includes the amethyst, topaz, garnet, etc.; while agate, lapis-lazuli, cornelian, etc., though much used for ornament, can scarcely be called gems. The fabrication of artificial gems is now prosecuted with skill and capital, and has become an important industrial art. One class called semi-stones or doublets, are made by affixing thin slices of real gems to an under part of the strass by means of invisible cement. In some cases an imitation is made by setting uncolored strass or quartz in jewelry with some colored "foil" at the back of it. Attempts have been made with a fair measure of success to manufacture true gems by artificial processes. In 1858 MM. Deville and Caron communicated to the

Academy of Sciences, Paris, a process for the production of a number of gems of the corundum class, as rubies, sapphires, etc. The process essentially consisted in exposing the fluoride of aluminium, together with a little charcoal and boracic acid, in a plumbago crucible protected from the action of the air, to a white heat for about an hour. Many experiments with a view to producing diamonds artificially have also been made.

In art and archæology the term gem is usually applied to a precious stone cut or engraved in ornamental designs, or with inscriptions. Stones on which the design is raised above the general surface are called cameos; those having the design sunk below the surface are called intaglios. Early specimens of cut gems are seen in the scarabæi or beetle-shaped signets worn in rings by the ancient Egyptians. Among the Greeks, Etruscans, and Romans gem sculpture held a high place, reaching its highest point under Augustus. Modern gem engraving dates from the beginning of the 15th century, the chief seats of the art being Italy and Germany. Rome is now the headquarters of the seal-engraving art. The stones used for cameo cutting often exhibit layers of different colors, so that the raised design has a tint distinct from the ground. Intaglios are very often executed in transparent stones, and the subjects treated in this manner are more limited in number. They are chiefly such as seals, devices, coats of arms, etc. See DIAMOND.

GEMARA (ge-mä'rä), that portion of the two Talmuds which contains the annotations, discussions, and amplifications of the Mishnah by the academies of Palestine on the one hand, and those of Babylon on the other. The Babylonian Gemara, more complete as well as more lucid than the Palestinian, possesses a much more highly valued authority. The final redaction of this latter falls in the middle of the 4th century A. D., while the former was not completed till 500 A. D. See TALMUD.

GEMINI, the third of the zodiacal constellations. The name is given from two conspicuous stars, Alpha and Beta Geminorum, the former named, after the example of the Greeks, Castor; the latter, Pollux. If an imaginary line be drawn through the belt of Orion and two bright stars in the line of the belt, it will nearly pass through Gemini. If again Regulus and Aldebaran be above the horizon, and the space between them be equally divided, the point of bisection will be in Gemini. Castor is a remarkable binary star of the first magnitude, Pollux is of the second. The sun enters the third sign of the zodiac which is different from the actual constellation about May 21, and passes from it to Cancer about June 21.

GENAPPE (zhe-näp'), a town of Belgium in the province of South Brabant, 15 miles from Brussels. Many battles have been fought here at different times. It is, however, chiefly memorable as the site of the first of that series of battles which, in June, 1815, was terminated on the field of Waterloo.

GENAZZANO (jā-nat-sä'nō), a small town, 27 miles E. of Rome, containing an old castle of the Colonna family, and the far-famed pilgrimage-chapel of the Madonna del Buon Consiglio (the Madonna of Good Counsel). Pop. 42,000.

GENEALOGY, the systematical investigation and exhibition of the origin, descent, and relations of families (or their "pedigree"). Persons descended from a common father constitute a family. Under the idea of "degree" of relationship is denoted the nearness or remoteness of relationship in which one person stands with respect to another. A series of several persons, descended from a common progenitor, is called a "line." A line is either "direct" or "collateral." The collateral lines comprehend the several lines which unite in a common progenitor. For illustrating descent and relationship genealogical tables are constructed, the order of which depends on the end in view. The common form of genealogical tables places the common stock at the head, and shows the degree of each descendant by lines. Some tables, however, have been constructed in the form of a tree, in which the progenitor (German, *Stammvater*, "trunk-father") is placed beneath as if for a root.

GENERAL, the title of a military office of varying importance in different countries. In the United States this office was created by Congress for General Grant and that of lieutenant-general for General Sherman. After the death of General Grant the office was conferred on General Sherman and General Sheridan was promoted to lieutenant-general, and on the death of General Sherman the office was revived for General Sheridan, and in 1917 for John Joseph Pershing. That of lieutenant-general was revived in 1895 for Maj.-Gen. John M. Schofield, and again in 1901, when Maj.-Gen. Nelson A. Miles was appointed its incumbent. When the office of lieutenant-general has expired by law the senior major-general becomes the commanding officer of the army, under direction of the President. There

are over 200 generals of different grades on the retired list.

GENERAL EDUCATION BOARD, an organization established for the purpose of distributing gifts made by John D. Rockefeller for educational purposes, and chartered by Congress in 1903. Over $50,000,000 have been given by Mr. Rockefeller to the Board. The Board generally makes its gifts to agencies and institutions already in existence and does not undertake independent educational work. The gifts of the Board are mainly devoted to the promotion of practical farming in Southern States; to the establishment of public high schools in Southern States; to the promotion of institutions of higher learning; and to schools for negroes. For all these purposes the Board has expended large sums, which, of course, were assigned only after a careful study of the needs and conditions of the recipients. The investigations which preceded the gifts of the Board were perhaps of as great importance to the development of education in the United States as the gifts themselves. The Board consists of 17 members and maintains headquarters in New York City. In 1920 the president was W. Buttrick, and the secretary, A. Flexner.

GENERAL STAFF, ordinarily a group of officers acting as an advisory board to the commander-in-chief of an army, each member of which is responsible for the detailed working out of the chief's orders in one particular field. The general staff of a commanding general may be compared to the cabinet of a premier in civil government. There is also a Great General Staff, not subservient to any commanding field officer, which plans the tactics and strategy of the whole national army. This system of military organization was first adopted in Germany. In the United States a General Staff Corps was first established by an act of Congress passed in 1903. Frequent amendments have since been made to the original act, notably in 1918, after the World War, when a thorough reorganization took place. The Chief of Staff of the United States Army in 1920 was General Peyton C. March, who occupied this position during the war with the Central Powers. Under his authority there were four chiefs of divisions; Chief of the Executive Division, the War Plans Division, the Purchase of Supplies Division and the Army Operations Division. Each of these chiefs is directly responsible to the Chief of General Staff and Secretary of War. The General Staff as a whole, together with the Secretary of War, is responsible for the working out of all the plans of campaign of the United States Army in the field. See MILITARY ORGANIZATION, UNITED STATES.

GENERAL THEOLOGICAL SEMINARY, the most important Protestant Episcopal seminary in the United States. It was established in 1817 in New York City by order of the General Convention, and began its work in 1819. From 1820 to 1822 the seminary was located in New Haven, but in the latter year was re-established in New York. For many years it suffered from the lack of the necessary financial backing. This condition, however, was remedied during the administration of Eugene A. Hoffman, which began in 1878 and lasted until his death in 1902. Through his own large gifts, as well as a result of his ability to interest other wealthy men, the seminary was established on an independent basis. The regular course covers three years. A graduate course is also offered. The degrees of D. D. and B. D. are conferred. The seminary is controlled by a Board of Trustees. No tuition fees are charged and there are many prizes and scholarships available. In 1921 the number of students was 71, and the number of teachers, 15. The governing official was H. E. Fosbroke, D. D.

GENERATOR, an apparatus for generating carbonic acid gas for charging soda-fountains, or bottles with aërated water. In chemistry, a term used to denote the elements or compounds from which a more complex substance is obtained. Thus ethyl, alcohol, and acetic acid are the generators of acetic ether; and benzoic acid and glycocoll are the generators of hippuric acid. By the action of acids or alkalies these substances can be resolved into their generators, and, so the constitution of a complex body can be determined; thus, Lecithin, a constituent of the brain, has the formula $C_{44}H_{90}N{\cdot}R{\cdot}O_9$; it has six generators, glycerin, phosphoric acid, stearic acid, glycol, methyl alcohol, and ammonia; therefore it is found to be a distearate glycerophosphate of choline, and choline has been found to be a trimethyl oxyethyl ammonium hydrate $(CH_3)_3N{\cdot}CH_2{\cdot}OH{\cdot}CH_2{\cdot}OH$. In distilling, a retort in which volatile hydrocarbons are distilled from liquid or solid matters.

In electricity, a DYNAMO-ELECTRIC MACHINE (*q. v.*) In music, a ground note, fundamental bass, root, derivative. The principal sound or sounds by which others are produced, as the lower C for the treble of the harpsichord, which be-

side its octave will strike an attentive ear with its twelfth above or G in alt, and with its fifteenth above or C in alt. In steam, a vessel in which steam is generated from water, for use in a steam engine, a heating apparatus, etc. The term was first applied to the Perkins steam boiler, in which water in small quantity was heated to a high temperature. It is now specifically applied to a class of instantaneous generators. The name is now rapidly coming into use for all apparatus for generating steam, being held to be more correct than the usual term.

GENESEE, a river of the United States, which rises in Pennsylvania, flows N. through New York, and falls into Lake Ontario 6 miles below Rochester, after a course of 145 miles. It is notable for its varied and romantic scenery, and its extraordinary falls. These falls are five in number; three of them occur about 90 miles from the mouth of the river, and are respectively 60, 90, and 110 feet high. The other two are near Rochester, and are both about 100 feet high.

GENESIS, in mathematics, a term formerly used, meaning the same as generation. In the genesis of figures, the moving magnitude or point is called the describent; the guiding line of the motion is called the dirigent.

In Scripture, the first book of the Pentateuch, of the Old Testament, and of the Bible. In the Hebrew original, as well as in the Septuagint and all modern versions, it occupies this place. It is called in Hebrew *bereshith*, which is its initial word, correctly translated in the authorized English version, "In the beginning."

The Jewish and, following it, the early Christian Church almost unanimously pronounced Moses the author of the work, deriving his knowledge of the events prior to his time either from direct revelation or from prior documents consulted under divine guidance. In A. D. 1753 Astruc, an eminent French medical professor, attempted to point out two such documents, distinguishable by the fact that in one the Divine Being is called almost always Elohim, while in the other he is named Jehovah. On the revival of this hypothesis in the 19th century, Hengstenberg and others contended against it, maintaining that in every case there was a reason why the Divine name which we find in the particular verse was chosen. Most critical scholars adhere to the opinion of the noted physician and theologist, Jean Astruc, and perpetually speak of the Elohist and the Jehovist.

GENEVA, a town of Switzerland; capital of the canton of the same name; at the W. extremity of the Lake of Geneva, where the Rhône issues, here crossed by several bridges, and dividing the town into two portions, the larger and more important of which is on the left or S. bank. The upper town, occupied chiefly by the wealthier citizens, consists of well-built houses and handsome hotels; the lower town, the seat of trade and residence of the poorer classes. The more important public buildings are the cathedral or Church of St. Pierre, a Gothic structure of the 10th, 11th, and 12th centuries; the town house in the Florentine style; the Musée Rath, containing a collection of pictures, etc.; the university building, nearly opposite the botanic garden, rebuilt in 1867-1871, and containing the public library, founded by Bonivard (see BONIVARD, FRANÇOIS DE), in 1551, and the Museum of Natural History. Manufactures, watches, music-boxes, and jewelry, for all of which the town is famed. In literature and science Geneva has long occupied a distinguished place, and it has been the birthplace or the residence of many eminent men, including Calvin, Beza, Knox, Le Sage, Necker, De Candolle, Rousseau, Sismondi, etc. Geneva early adopted the principles of the Reformation, and chiefly through the teaching of Calvin the town acquired an important influence over the spiritual life of Europe, and became the center of education for the Protestant youth of Great Britain, France, and Germany. Pop. for the commune (1919) 125,520. Geneva was chosen in 1919 by the great powers for the home of the League of Nations and an administration building was purchased in 1920.

The canton is bounded by the canton of Vaud and the Lake of Geneva, and by France; area, 108 square miles. Pop. (1919) 170,000. It belongs to the basin of the Rhône; the only important streams are that river and the Arve, which joins it a little below the town of Geneva. Manufactures, chiefly clocks and watches, music-boxes, mathematical instruments, gold, silver, and other metal wares, woolen cloths, and silk goods of various descriptions, hats, leather, and articles in leather; and there are numerous cotton mills, calico printing works, and dye works. The territory of Geneva having, through the Congress of Vienna, obtained an accession of 15 communes, detached from France and Savoy, was admitted a member of the Swiss Confederation in 1814, and ranks as the 22d canton. Its constitution of 1848 is the most demo-

cratic in the federation. All religious denominations are declared to have perfect freedom, but two of them are paid by the state—the Roman Catholics, amounting to rather more than a third of the population, and the Protestant National Church. Geneva was made the official meeting place of the League of Nations, and the first regular session convened there in November, 1920. Language, French.

GENEVA, a city in Ontario co., N. Y.; on Seneca Lake, the Seneca and Cayuga Canal, and the New York Central and the Lehigh Valley railroads; 50 miles S. E. of Rochester. It is the seat of Hobart College, the Geneva Medical College, and the State Agricultural Experiment Station, and has important manufactures, extensive waterworks, public library, high school, electric lights and street railroads, and National banks. Pop. (1910) 12,446; (1920) 14,648.

GENEVA BIBLE, a translation of the Bible into English, made and published at Geneva, chiefly by English Protestant refugees. It was the first English Bible which adopted the Roman instead of the obsolescent black type, and the first which recognized the division into verses; it was the first also which omitted the Apocrypha. From its stating, in Gen. iii: 7, that our first parents made themselves "breeches," it is sometimes called the Breeches Bible.

GENEVA COLLEGE, a coeducational institution in Beaver Falls, Pa., founded in 1848 under the auspices of the Reformed Presbyterian Church; reported at the end of 1919: Professors and instructors, 18; students, 480. President R. H. Martin, D. D.

GENEVA, LAKE OF, or LAKE LEMAN (Latin, Lacus Lemanus), the largest of the Swiss lakes, extending in the form of a crescent, with its horns pointing S., between France on the S. and the cantons of Geneva, Vaud, and Valais; length, measured on the N. shore, 55 miles; and on the S. shore 40 miles; central breadth, about 6 miles; area, 331 square miles; greatest depth, 1,015 feet. It is 1,150 feet above the sea. The Rhône, which enters the E. extremity a muddy, turbid stream, issues from the W. extremity perfectly pellucid, and likewise of the finest blue.

GENEVA, UNIVERSITY OF, a university of Switzerland, founded in 1559 as the Academy of Geneva, and known under its present name since 1873. Its faculty of theology after its foundation was under the direct supervision of Calvin and Béza, and the institution soon became the center of Protestant scholarship. It maintained its high reputation throughout all the centuries of its existence, and both among its teachers and its students there are to be found many renowned names. It has always attracted a large number of students from foreign countries. It has faculties of theology, law, medicine, philosophy and science. In 1918-19 the teaching staff numbered 155, and the student body, 881. Women are admitted to all courses on the same basis as men.

GENEVIÈVE (zhen-vyāv), **ST.**, the patron saint of Paris; born in Nanterre, near Paris, about 422. She devoted herself while yet a child to the conventual life. Her prayers and fastings are credited with having saved Paris from threatened destruction by Attila in 451. Her festival is held Jan. 3. She died in Paris, Jan. 3, 512.

GENGHIS KHAN, or **JENGHIS KHAN** (jen'gis khän), a Mongol conqueror; born near the Onon river, Mongolia, in 1162. His father was chief over 30 or 40 clans, but paid tribute to the Tartar Khan. He succeeded his father when only 14 years of age, and made himself master of the neighboring tribes. A great number of tribes now combined their forces against him. But he found a powerful protector in the great Khan of the Karaite Mongols, Oung, or Ung, who gave him his daughter in marriage. After much intestine warfare with various Tartar tribes Genghis was proclaimed Khan of the United Mongol and Tartar tribes.

He now professed to have a divine call to conquer the world, and the idea so animated the spirit of his soldiers that they were easily led on to new wars. The country of the Uigers, in the center of Tartary, was easily subdued, and Genghis Khan was now master of the greatest part of Tartary. In 1209 he passed the great wall of China, the conquest of which country occupied him more than six years; the capital Yenking (now Peking), was taken by storm in 1215 and plundered. The murder of the ambassadors whom Genghis Khan had sent to the King of Kharism (now Khiva) occasioned the invasion of Turkestan in 1218 with an army of 700,000 men; and the two cities of Bokhara and Samarcand were stormed, pillaged, and burned. Seven years in succession was the conqueror busy in the work of destruction, pillage, and subjugation, and extended his ravages to the banks of the Dnieper. In 1225, though more than 60 years old, he marched in person at the head of his whole army against the King of Tangut (northwestern

China), who had given shelter to two of his enemies. A great battle was fought in which the King of Tangut was totally defeated with the loss of 300,000 men. The victor remained some time in his newly subdued provinces, from which he also sent two of his sons to complete the conquest of northern China. At his death in Mongolia, in 1227, his immense dominions were divided among his four sons.

GENNESARET, LAKE OF. See GALILEE, SEA OF.

GENOA (jen'ō-ä) (ancient Genua), a city of Italy, situated on the Gulf of Genoa, at the foot of the Apennines, the capital of the province and the most important seaport; 801 miles S. E. of Paris. In a nine-mile circuit it rises like an amphitheater of churches, palaces and houses. The streets are lined with tall buildings, some of them of marble and handsome architecture, but now in many cases hotels or business places. Of the palaces the most famous are the ducal palace formerly inhabited by the doges, and the Doria, presented in 1529 to the great Genoese citizen Andrea Doria, whose residence it was during his presidency of the republic. The palaces Brignole-Sale, Reale, Durazzo-Pallavicini, Spinola, Balbi-Senarega, and others possess great interest on account of their historical fame and architectural beauty. Many of them contain galleries of paintings; the Brignole Sale has works by Van Dyck, Rubens, Albrecht Dürer, Paolo Veronese, Guercino, etc. Among the churches are the cathedral of St. Lorenzo, a grand old pile in the Italian Gothic style; the church of St. Ambrogio (1589), containing pictures by Guido Reno and Rubens; the church of St. Stefano, containing an altarpiece by Giulio Romano; L'Annunziata, splendid inside with marbles and rich gilding. The marble municipal palace, built in the Late Renaissance style, and the palace of the Dogana must also be mentioned. Genoa has a university, founded in 1243, a library of 116,000 volumes; also numerous technical schools. The hospital, the asylum for the poor (capacity 2,200), the deaf and dumb institution, and the hospital for the insane are among the finest institutions of their kind in Italy. There are numerous excellent philanthropic foundations, as the Fieschi, an asylum for female orphans. The public library contains over 50,000 volumes; and there are the Academy of Fine Arts, founded (1751) by the Doria family; the Carlo Felice Theater, one of the finest in Italy; and the Verdi Institute of Music. There is a fine monument to Columbus by Lanzio (1862).

Genoa is the commercial outlet of a wide extent of country, of which the chief exports are rice, wine, olive oil, silk goods, coral, paper, macaroni, and marble. The imports are principally raw cotton, wheat, sugar, coal, hides, coffee, raw wool, fish, petroleum, iron, machinery, and cotton and woolen textiles. The principal industries are iron works, cotton and cloth mills, macaroni works, tanneries, sugar refineries, and vesta-match, filigree, and paper factories. Pop. commune, about 300,000; province, pop. 1,120,000.

GENOA, GULF OF, a large indentation in the N. shore of the Mediterranean, N. of Corsica, having between the towns of Oneglia on the W. and Spezia on the E. a width of nearly 90 miles, with a depth of about 30 miles.

GENS, in Roman antiquities, a class or house, the individuals composing which were termed in reference to each other Gentiles. Each gens was made up of a certain number of branches or families (familiæ) and each familia was composed of individual members. Several gentes (plural) made up the curiæ and tribes. The members of each gens bore a common name, as the Fabian gens, the Julian gens, etc., and were united by certain common religious rites.

GENSERIC, or **GEISERIC**, a king of the Vandals. He passed from Spain to Africa, where he took Carthage, and laid the foundation, in Africa, of the Vandal kingdom, which was composed of Numidia, Mauritania, Carthage, Corsica, Sardinia, and the Balearic Isles. In the course of his military expeditions he invaded Italy, and sacked Rome in 455. He died in 477.

GENTIAN (-shan), in botany, the English name of the genus *Gentiana*. Numerous species exist almost all over the world, the best known being the marsh gentian (*Gentiana pneumomanthe*), the spring gentian (*G. verna*), the small alpine gentian (*G. nivalis*), the small-flowered gentian (*G. amarella*), the field gentian (*G. campestris*), and the American fringed gentians (*G. crinata* and *G. detonsa*). *G. lutea* grows in Switzerland and the mountainous parts of Germany.

In pharmacy, *Gentianæ radix* (gentian root), the dried root of *Gentiana lutea*. The root occurs in lenghtened cylindrical pieces, from half an inch to one inch in diameter, and several inches long, wrinkled longitudinally, and often twisted; brown externally, yellow, tough, and spongy within; it has a sweet smell and a sweet and bitter taste. It is used to prepare *Extractum gentianæ* (Extract

of gentian), *Infusum gentianæ compositum, Mistura gentianæ* (gentian mixture), and *Tinctura gentianæ composita* (compound tincture of gentian). Gentian is a bitter stomachic tonic, which improves the appetite and gives tone to the stomach.

GENTILES, in Scripture, all the nations of the world, excepting the Jews. In the Old Testament it is the rendering of the Hebrew word *goim*=peoples, nations, the plural of *goi*=a nation, a people. At first it was used as a mere ethnological word, and quite respectfully, but as the Jews became more conscious of their privileges they employed it more and more scornfully of the nations around (Gen. x: 5; Isa. lxvi: 19; Jer. xiv: 22). In the New Testament Gentiles is the rendering of the Greek *ethne*=the plural of *ethnos*=a number of people living together, a nation. St. Peter, moved by a vision, was the first of the Twelve to preach to the Gentiles (Acts x.), but the apostle of the Gentiles was St. Paul (Gal. ii: 8).

GENUFLEXION, the act of bending the knees in worship. There are frequent allusions to genuflexion in the Old and New Testaments, and it would appear that the use was continued among the early Christians. Genuflexion obtains, both by rule and prescription, in various places in the offices of the Roman Catholic Church, and at different parts of the services of the Church of England.

GENUNG, JOHN FRANKLIN, an Amercian educator; born in Willseyville, N. Y., Jan. 27, 1850; was graduated at Union College in 1870 and at the Rochester Theological Seminary in 1875; became Professor of Rhetoric in Amherst College. His publications include "Tennyson's 'In Memoriam,' Its Purposes and Its Structure"; "Practical Elements of Rhetoric"; "Handbook of Rhetorical Analysis"; "Outlines of Rhetoric"; "Study of Rhetoric in the College Course"; "Words of Koheleth" (1904) "The Idylls and the Ages" (1907); "Guide Book to Biblical Literature" (1916). He died in 1919.

GENUS, a class, a kind, a species. In logic, a class of objects containing several species; a class more extensive than a species; a universal which is predicable of several things of different species. In music, sort or class, especially used with reference to scales; as, the diatonic, chromatic, and enharmonic genera (plural). In zoölogy and botany, an assemblage of species or of sub-genera closely agreeing together in all essential characteristics, not found in any others of the sub-family or family to which they belong. It may be divided into sub-genera. Among animals, *Mus* is a genus containing, among other animals, both the domestic mouse and the rat, which, differing in size, etc., and being clearly distinct species, have still a community of structure obvious to all. So also among plants, the various species of the rose constitute the genus *Rosa*. In the Latin name of a plant or animal adopted by naturalists, the first word indicates the genus, and the second the species: as, *Mus musculus, Rosa spinosissima*. In other sciences, sometimes a classification like that adopted by naturalists is used. Thus, of skin diseases there is a genus *Acne* with various species, *A. simplex, A. rosacea*, etc.

GENZANO (jen-zä'nō), a town of Italy, on the Via Appia, 16 miles S. E. of Rome, near the lake of Nemi. It contains the Cesarina palace, and is noted for its annual flower festival, held on the eighth day after Corpus Christi, which attracts many visitors.

GEODESY (-od'e-si), that branch of applied mathematics which determines, by means of observations and measurements, the figures and areas of large portions of the earth's surface, or the general figure and dimensions of the earth; that branch of surveying in which the curvature of the earth is taken into account. This becomes necessary in all extensive operations.

GEOFFREY OF MONMOUTH, a famous English chronicler; born probably in Monmouth about 1100. He was the author of a famous chronicle or history of the first British kings, often quoted by men of letters and remarkable for its curious legends. Geoffrey was successively archdeacon of Monmouth and bishop of St. Asaph. He died in Llandaff in 1152 or 1154.

GEOFFROY ST. HILAIRE, ETIENNE (zhō-frwä' san-tē-lar'), a French naturalist; born in Étampes, France, April 15, 1772. He was educated at the colleges of Navarre and Lemoine. At the age of 21 he obtained the chair of zoölogy in the Parisian Jardin des Plantes. As a member of the Egyptian expedition in 1798 he founded the Institute of Cairo, and returned about the end of 1801 with a rich collection of zoölogical specimens. In 1807 he was made a member of the Institute, and in 1809 Professor of Zoölogy at the Faculty of Science. He devoted himself especially to the philosophy of natural history. Among his principal works are: "The Principle of Unity in Organic Composition"; "Philosophy of Anatomy"; "Natural History

of the Mammifers"; "Ideas of Natural Philosophy" (1838). He died in Paris, June 19, 1844.

GEOGRAPHICAL SOCIETIES, associations formed with the view of obtaining and disseminating geographical knowledge. In point of seniority the first of these associations is the Geographical Society of Paris, founded in 1821, whose magazine, the "Bulletin of the Geographical Society," began in 1822. The Prussian Geographical Society held its first sittings in Berlin in 1828, and publishes a yearly "Journal." The Royal Geographical Society, established in London in 1830, has a capital of over £25,000, and devotes large sums annually to aid the cause of geographical research, or as rewards and recognition of services rendered to the science. Its proceedings are published monthly. The Royal Scottish Geographical Society, founded in 1844, also publishes a monthly magazine. The Russian Geographical Society, founded at St. Petersburg in 1845, has greatly extended our knowledge of Asia, and especially Asiatic Russia.

The American Geographical Society was founded at New York in 1852. The National Geographic Society was founded in 1888.

GEOGRAPHICAL SOCIETY, AMERICAN, a society organized in 1852 for the purpose of investigating and disseminating geographical knowledge. The headquarters of the society are located in New York City and contain a valuable library of over 50,000 volumes. The executive council of the society awards yearly two gold medals, the Collum and the Daly medals, named respectively after their founders. The society publishes a monthly bulletin. Its collections and library are open for free reference and inspection to the public. The membership of the society is about 4,000.

GEOGRAPHIC NAMES, UNITED STATES BOARD ON. An organization instituted in 1890, by President Harrison, having for its object the introduction of uniformity in the orthography of geographic names. The board has fifteen members, representing government departments and the Smithsonian Institute. Local usage is the rule generally followed in the adoption of names though regard is had to etymology, simplicity, and correctness in the decisions arrived at. New names, suggested by officers and employees of the government, are passed on by the board before publication. Most of the work of the board in recent years has been in connection with oversea possessions.

GEOGRAPHIC SOCIETY, NATIONAL, a society founded in 1888 at Washington, D. C., for the purpose of collecting and diffusing geographic knowledge. The principal means of accomplishing the latter purpose is the official organ of the society, the "National Geographic Magazine." The research work of the society is carried on independently, as well as in co-operation with other institutions and organizations. The society has organized or participated in many scientific and exploring expeditions in North and South America. The membership of the society is over 500,000. Its headquarters at Washington are located in a building owned by the society and containing a valuable library of over 50,000 volumes.

GEOGRAPHY, a delineation or description of the earth as it at present is, leaving it to geology to investigate how it came into its present condition. It may be divided into three distinct sciences, mathematical or astronomical, physical, and political geography. Mathematical geography views the earth as a planet; it investigates its relations to the sun, the moon and other bodies belonging to the solar system. It gives attention to the angle at which its axis is inclined to the ecliptic, the position of the arctic and antarctic circles and the tropics of Cancer and Capricorn, the parallels of latitude, and the meridians of longitude. Physical geography treats of the present distribution of sea and land, the currents of the oceans, the climates of the several continents and islands. With regard to the land, it commences by indicating the position of the mountain chains and table lands, thus fixing the positions of the great rivers, to which attention is next turned. Then the position of the alluvial plains, the deserts, etc., is pointed out; the distribution of the plants over the surface of the earth, often called botanical geography, follows next; then that of the animals; and finally that of the several races of mankind. This branch of the science approaches those of geology, hydrology, meteorology, botany, zoölogy, and ethnology or anthropology. Finally, there follows political geography; which treats of the present distribution of political power over the world, the position and resources of the several empires, kingdoms, republics, etc.

History.—Eratosthenes, B. C. 240, was one of the earliest ancient geographers of eminence; but the greatest names in this department were Strabo—who lived during the reigns of Augustus and Tiberius—and Ptolemy, who flourished about A. D. 139. The discovery of the

passage round the Cape of Good Hope and that of America in the 16th century gave a great impulse to its modern advance. In the United States geographical science has been carefully fostered by the government, a board being appointed to supervise all practical work and to insure uniformity of nomenclature. Under the patronage of several of the earlier presidents, there was great activity in geographical research and exploration of the vast domain which lay to the W. of the then settled portions of the country. The most notable of these early expeditions was that undertaken by authority of President Jefferson, the leaders of the enterprise being Gen. Meriwether Lewis and Gen. William Clark (afterward governor of the territory of Louisiana). This attempt bore fruit in the settlement of the great Mississippi basin to the N. W., and it was supplemented a few years after by the expedition under Lieut. (afterward Gen.) John C. Frémont. The great apostle of the United States Coast Survey was Ferdinand Rudolph Hassler, who was invited to the United States by President Tyler. A geographical congress was held at Paris in 1875, and at the Columbian Exposition in Chicago.

GEOK TEPE, a town and fortress of central Asia, oasis of the Akhal-Tekke-Turkomans, lon. 58° E., lat. 38° N. In 1879 the Russians under General Lomakine were defeated here with heavy loss, but January, 1881, it was stormed by General Skobeleff after a three weeks' siege, when about 8,000 fugitives were massacred, no quarter being given.

GEOLOGICAL SURVEY, UNITED STATES, a bureau of the Interior Department created for the purpose of preparing a map of the United States, classifying the public land, examining the geological structure, mineral resources, and the products of the country. To these duties have since been added those of investigating the extent to which the arid lands of the West can be redeemed by irrigation, segregating the irrigable from the non-irrigable lands, and the selection of sites for reservoirs and canals for the purposes of irrigation. The maps made by the Geological Survey are all on a large scale, and have a degree of accuracy and a minuteness in detail incomparably greater than ordinary maps. The smallest scale is 1-250,000, or about 4 miles to the inch, and this scale has been employed for regions of the West which are thinly settled, and where the topography is mountainous. But it has been superseded by scales of 2 miles and 1 mile to the inch, the latter for populous regions with slightly or moderately diversified topography, like Massachusetts and New Jersey. The maps are engraved on sheets which, with the 4-mile scale, embrace 1° of lat. and 1° of lon. The 2-mile maps embrace tracts of half the above linear or one-fourth the areal dimensions; the 1-mile maps embrace one-fourth of the above linear and one-sixteenth the areal dimensions. The topography is represented by "contours" or "grade curves"; *i. e.*, by lines of equal altitude above the sea. The contour intervals are uniform for each sheet, but vary in different sheets acording to the character of the country. In some tracts the contour intervals represent a difference of elevation of 200 feet, these being in very mountainous countries, while in flat countries and on large-scale sheets they may be as small as 20 feet. The general construction and methods of all maps are, however, the same.

There are three principal branches of the geological survey: (1) Geology proper; (2) Topography; (3) Irrigation surveys. The geological branch investigates the stratigraphy, the geological structure and history, the lithology, mineralogy, and palæontology, the ores and mines, and in general the natural economics, resources, and physical geography of the country. The topographic branch prepares the maps; the irrigation branch investigates the possibilities of irrigation and selects the irrigable lands and sites available for reservoirs and canals. The work of the topographic branch is the basis of the work of the other two, and all the results of the latter are projected on the maps. The publications of the Survey are (1) the annual report of the director, which, besides the administrative report, contains memoirs on geologic subjects by members of the survey, and is distributed according to the regulations of the Interior Department; (2) monographs on the leading subjects of special investigation by the geologists; (3) bulletins on more limited special subjects of research; (4) an annual volume of mineral statistics. The last three are distributed gratuitously only to designated libraries and to learned corporate societies, which send their own publications in exchange. Otherwise they are sold by the director at 10 per cent. above the cost of publication, and the money deposited in the Treasury.

GEOLOGY, the science which investigates the bygone history of the earth with the view of accounting for its present condition. It is the province of physical and political geography to de-

scribe what the earth now is, geology attempts to furnish the reason why.

History.—Though it was only during the 19th century that geology has started up into the vigor of manhood, yet its birth took place ages ago. Isolated geological observations or hypotheses occur abundantly in ancient literature. "As for the earth, out of it cometh bread; and under it is turned up as it were fire" (Job xxviii: 5); an anticipation of the Huttonian hypothesis. Egypt, according to Herodotus, is the gift of the Nile, that is, the river brought down the silt which constitutes the fertile soil of the delta and other parts of Lower Egypt. The best geologist of antiquity was the geographer Strabo, who lived in the 1st century A. D. Modern geology began with Werner, who was a professor in the School of Mines at Freiberg, in Saxony, in 1775. He believed that a series of universal formations had been deposited in succession from a chaotic fluid. Basalt was supposed to have had the same origin, but to this view various continental observers were opposed. Hutton published in 1788 his "Theory of the Earth," developed in a separate work in 1795. He assumed no causes but those now existing. He showed that geology and cosmogony were different. "In the economy of the world," he said, "he could find no trace of a beginning, no prospect of an end." He held basalt, granite, etc., to be of igneous origin. The Wernerians were called Neptunists, their opponents Vulcanists. In 1798 Cuvier published his "Fossil Bones," which gave a great impulse to palæontology.

Forces or Causes in Operation.—After inquirers had outgrown the belief in fossils produced by the plastic power of nature or all entombed simultaneously by the Noachian deluge, the belief was entertained that there had been a series of creations and catastrophies, the latter causing the universal destruction of all pre-existing species. The belief was also entertained that some external causes, say the forces producing earthquake and volcanic action, were more potent in former times than now. This Professor Huxley calls catastrophism, which he defines to be any form of geological speculation which, in order to account for these phenomena, supposes the operation of forces different in their nature or immeasurably different in power from those which are at present in action in the universe.

The second school of geology is that called by Huxley uniformitarianism. This looks only to causes now in operation for the explanation of geological phenomena. Of this school Hutton was the founder, though it was Sir Charles Lyell that carried it forward to triumph. He showed the enormous changes which the causes now in operation are still producing, and that nearly every phenomenon, attributed to abnormally potent causes acting suddenly and briefly, could be produced by causes not more intense than those in action now, but operating through immense periods of bygone time. In his "Principles of Geology," he examines aqueous causes, the action of water acting in connection with tides, currents, etc., in seas, rivers, and lakes, also the action of ice in all its forms. Next he inquires into igneous causes, volcanoes, and earthquakes. Climate and organic life are also carefully investigated in the work.

The doctrine of the third school of geologists is called by Professor Huxley evolutionism; it accepts nearly the whole of uniformitarianism, except the part referring to the development of organic life. In his later years Sir Charles Lyell became an evolutionist. See DARWINIAN THEORY: EVOLUTION.

Geologic Time.—Both the uniformitarian and the evolutionist believe that they may draw to any extent on what may be called the bank of time, which will be found "ready to discount any quantity of hypothetical paper." Sir William Thompson holds that any such drafts must be limited "within some such period as 100,000,000 years"; and another natural philosopher considers the time at call only about 60,000,000 years. Huxley believes the necessity for these limitations is not proved, though perhaps one, two, or three hundred millions of years might be enough to account for geological phenomena.

With regard to the subdivision of the time, long or short, at the gelogists' command, the sedimentary strata having been laid down by water, the relative thickness of each stratum will measure the proportion of geologic time required for its deposition.

Geologic strata.—The geological record is made up as follows, beginning with the five great

PERIODS.

5. Quaternary. The age of man.
4. Cenozoic Period. Age of Mammals.
3. Mesozoic Period. Age of Reptiles.
2. Palæozoic Period. { Age of Coal Plants. / Age of Fishes. / Age of Invertebrates.
1. Archæan Period. Lifeless and dawn of life.

The following list gives the eras together with their dependent series and sub-divisions in descending order:

ERAS AND SERIES.

9. Quaternary or Post Tertiary: (3) Recent, (2) Champlain, (1) Glacial.

8. Tertiary Era: (4) Pliocene, (3) Miocene, (2) Oligocene, (1) Eocene.

7. Cretaceous Era: (4) Laramie, (3) Colorado, (2) Dakota, (1) Lower.

6. Jura-Trias: (b) Jurassic; (3) Purbeck, (2) Oölite, (1) Lias, (a) Triassic: (4) Rhætic, (3) Upper, (2) Middle, (1) Lower.

5. Carboniferous Era: (3) Permian, (2) Carboniferous, (1) Sub-carboniferous.

4. Devonian Era: (5) Catskill and Chemung, (4) Portage, (3) Hamilton, (2) Corniferous, (1) Oriskany.

3. Upper Silurian: (3) Lower Helderberg, (2) Onondaga, (1) Niagara.

2. Lower Silurian: (3) Trenton, (2) Chazy, (1) Calciferous.

1. Cambrian.

Eozoic (dawn of life), Azoic (lifeless).

SUB-DIVISIONS.

9. Quaternary: Pleistocene; 8. Tertiary: English Crag, Upper Molasse, Rupelian and Tongrian of Belgium; 7. Cretaceous: Upper Chalk, Lower Chalk, Chalk Marl, Gault, Neocomian, Lower Greensand; 6. Jura-Trias: Wealden, Purbeck, Portland, Kimmeridge, Oxford Oölites, Lower or Bath Oölite, Lower Lias, Marlstone, Upper Lias, Kössen beds, Dachstein beds; Alpine Trias, in part; Keuper, Muschelkalk, Bunter-Sandstein; 5. Carboniferous: Magnesian Limestone, Lower Red Sandstone, or Rothliegendes, Upper Coal Measures, Lower Coal Measures, Millstone Grit, Lower Carboniferous, Mountain Limestone; 4. Devonian: Old Red Sandstone—Catskill Red Sandstone, Chemung, Portage, Genesee Slate, Hamilton beds, Marcellus Shale, Upper Helderberg, Schoharie, Grit, Oriskany Sandstone; 3. Upper Silurian: Lower Helderberg, Onondaga Salt Group, Salina beds, Water Lime, Niagara Group, Wenlock Group, Clinton Group, Medina Sandstone (Upper Llandovery); 2. Lower Silurian: Hudson River beds, Cincinnati Group, Lower Llandovery, Utica Shales, Trenton Limestone, Caradoc and Bala Limestone, Black Shales, Armorican Grit, Gothlandian Calcareous Sandrock, Magnesian Limestone, Lower, Middle and Upper Cambrian; 1. Archæan: Laurentian, Huronian.

Other Rocks.—For these, see IGNEOUS ROCKS.

Fossils.—For these, see FOSSIL: PALÆONTOLOGY.

Applied Geology.—Geology applied to industrial or other practical purposes; as, for instance, to mining, drainage, railway tunneling, etc.

GEOMETRIC SQUARE, an instrument for measuring distances and heights, and useful for its portability as well as for the facility, by the common rule of three, of solving most of the problems arising from its use. It is made of brass or wood, 12 or 18 inches square, and the quadrant is graduate in each direction. The two sides opposite to the axial point of the alidade are graduated to 100 equal parts, with major divisions of 10 of said parts. The 100 point finishes at the angle obliquely opposite the center from which the arc is struck. One side represents the horizon, and the alidade with two sides is equal in length to the diagonal of the square. The alidade has divisions equal to those on the sides of the square.

GEOMETRY (Greek *geometria*=the measurement of land; *geo*, for *geios*=belonging to the earth, and *metria*=measurement), properly the measurement of the earth or of land, but now used exclusively of the abstract science to which practical land measurement gave or may have given birth. It is the science of space, whether linear, superficial, or solid.

History.—Who first invented or cultivated geometry is uncertain. The Hindus have a geometry apparently of indigenous growth. Some knowledge of geometry was apparently possessed by the builders of the Egyptian pyramids. Diodorus and others attribute the invention or discovery of geometry to Egypt, which is doubtful. The Greeks surpassed all ancient nations in their attainments in the science. Euclid founded a school of mathematics at Alexandria some time in the reign of Ptolemy Lagus, B. C. 323 to 284. His "Elements" are still in use in many schools and colleges. See MATHEMATICS.

Nature of the Science.—Geometry, like mathematics, is built up on rigorous demonstration. To prevent the possibility of error in reasoning it is needful to commence with definitions of the terms employed. Then follow in Euclid's "Elements" postulates or concessions demanded as to what is possible to be done; then axioms, simple mathematical statements worthy of being believed. A popular belief is that the whole science of geometry rests on the axioms; it is really, however, based on the definitions; thus the whole third book of Euclid follows naturally from the definition of a circle.

Analytical Geometry.—The analytical investigation of the relations and properties of geometrical magnitudes. It is divided into determinate and indeterminate geometry, according as the num-

ber of possible solutions in any given case is limited or unlimited.

Descriptive Geometry.—Geometry of which the feature is to represent solid bodies with accurate form, perspective, etc., on paper, or other plane surface.

Elementary Geometry. — Geometry treating of points, lines, surfaces, or the ordinary solids, as distinguished from conic sections, etc., called the higher geometry. Higher geometry, see under paragraph above.

Plane Geometry. — Geometry relating to surfaces, or to lines drawn or points placed on them.

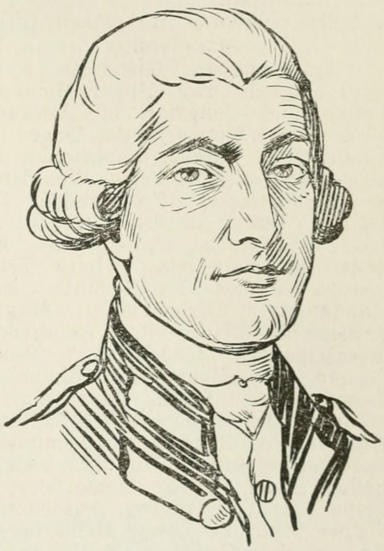
Solid Geometry.—Geometry relating to solids.

GEORGE, a division of the W. province of Cape Colony, on the S. coast, E. of Cape Town. It contains 2,600 square miles. It is valuable chiefly for its pasturage and its timber. The town of George stands 6 miles N. of the coast, and has a population of over 2,000. On the coast is the port of Mossel Bay.

GEORGE I., King of England; born in Hanover, March 28, 1660. He was son of Ernest I., first Elector of Hanover, and of the Princess Sophia, granddaughter of James I., King of England, and succeeded his father in the electorate, in 1698. On the death of Queen Anne, in 1714, he was called to the throne of England, and this was the beginning of the English dynasty of Brunswick. He gave his support to the Whigs, and was prudently neutral as regarded the Continental wars of his time, yet he joined the Triple Alliance of 1717 and the Quadruple Alliance of 1718 against Spain. He had as premier Sir Robert Walpole, whose genius repressed all attempts at disorder, and nullified the efforts of the so-called Pretender, James III. Unfortunate in his family relations, George was obliged to divorce his wife, Sophia of Zell, charged with an intrigue, and imprison her in the castle of Ahlen, where she ended her days in 1726, after a confinement of 32 years. He died in Osnabrück, June 11, 1727.

GEORGE II., King of England, son of the preceding; born in Hanover, Nov. 10, 1683. He succeeded his father in 1727. He retained as his prime minister Sir Robert Walpole, who preserved the country from war during the first 12 years of his reign. In the war of the Austrian Succession he declared himself on the side of the Empress Maria Theresa, and against France. His armies, successful at Dettingen (1743), failed signally at Fontenoy (1745) and at Laffeld (1747), but the campaign was closed by the treaty of Aix-la-Chapelle (1748). Meantime, however, his throne had been strengthened by the victory of Culloden, gained over Prince Charles Edward Stuart and his adherents in 1746. War having in 1755 again broken out on the continent of Europe, England experienced fresh reverses in Germany and lost her Hanoverian dominions, but these losses were more than compensated by brilliant and valuable conquests in the East Indies and in America. George was the founder of the British Museum. He died in London, Oct. 25, 1760.

GEORGE III., King of England, son of Frederick Louis, Prince of Wales; born in London, June 4, 1738. He succeeded his grandfather, George II., in 1760. In the early part of his reign he gained brilliant successes over France and Austria in the Seven Years' War,



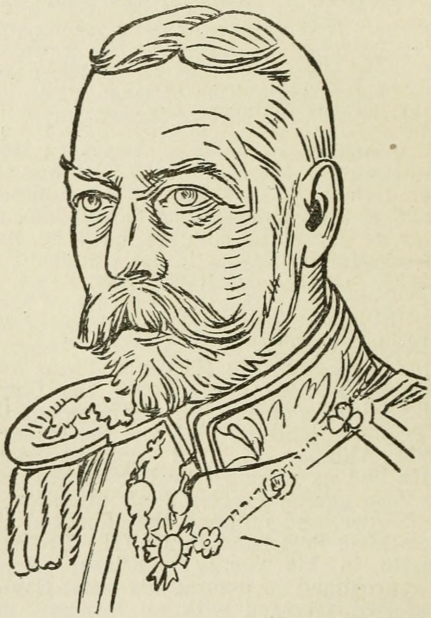
GEORGE III. OF ENGLAND

and in 1763 concluded an advantageous peace. In 1764 George Grenville succeeded to Lord Bute as premier, and the American Stamp Act was passed the following year. After a long and fruitless war, the independence of the United States was acknowledged. In 1782 Lord Shelburne was placed at the head of the State, with Mr. Pitt, son of the Earl of Chatham as Chancellor of the Exchequer. In 1783 the memorable coalition ministry between Mr. Fox and Lord North was formed. To this the king was decidedly hostile; and as soon as Mr. Fox's India bill had been rejected by the Lords, he sent a message to him and Lord North,

commanding them immediately to return him their seals of office. On the following day Mr. Pitt became prime minister. In 1789 the king was afflicted with mental aberration, which lasted from the beginning of November till the following February. In 1798 public distress appeared to have reached its climax, and the Irish rebellion broke out. In 1800 the Act of Union between Great Britain and Ireland was passed; and in order to bring those over who opposed the measure, the ministers allowed a tacit understanding to prevail, that it would be followed by certain political concessions. George, however, could never be persuaded that he could admit the Catholics to political power, without violating the spirit of his coronation oath—the consequence of which was the retirement from office of Mr. Pitt and his colleagues in 1801, and the formation of a new ministry, headed by Mr. Addington. Negotiations were now speedily entered into, which led to the treaty of Amiens. When the resumption of hostilities took place in 1803 there was an evident demonstration of public satisfaction throughout all ranks. The Addington administration proved incompetent, and Mr. Pitt, in 1804, again took the helm of State; but he died in 1806, and the Grenville party, which Fox had joined, went into office. In 1807 Lord Grenville and his colleagues attempted to change the king's opinions with regard to Catholic emancipation; but George was inflexible, which led to the ejection of the Fox and Grenville party, and the Perceval administration succeeded them. The death of his youngest child, the Princess Amelia, toward the close of 1810, gave the king a shock that renewed his insanity. He died in Windsor, Jan. 29, 1820.

GEORGE IV., King of England; born in London, Aug. 12, 1762. He became Prince Regent in 1811, and succeeded his father, George III., in 1820. Though he had at first declared for the Whigs, he for a long time gave himself up to Tory influence, and had as his prime ministers Lord Liverpool and the Duke of Wellington. During his regency occurred the final overthrow of Napoleon. He caused the passage of numerous laws against the liberty of the press, and had incessant troubles in Ireland to put down. In 1823 he again took sides with the Whigs, and selected as premier the celebrated George Canning. In 1829 the bill granting Catholic emancipation was passed. George IV. married, in 1795, the Princess Caroline of Brunswick, whom he afterward caused to be tried before the law courts on a charge of adultery. He died in Windsor, June 26, 1830.

GEORGE V. (GEORGE FREDERICK ERNEST ALBERT), King of Great Britain and Ireland and of the British dominions beyond the seas, Emperor of India. He was born in 1865. Following the death of his elder brother he became direct heir to the throne. His choice as a career had been with the navy, which he entered in 1877, studying at Greenwich and becoming, successively, lieutenant, captain, rear-admiral, and vice-admiral. After the death of his brother he became betrothed to Princess Victoria Mary of Teck, who had been the fiancée of his brother, and they were married in 1893. Following the death of Queen Victoria in 1901 and the accession of Edward VII., he journeyed round the world, making addresses in the various British colonies. He then was officially installed as Prince of Wales, and took the part previously taken by his father in assisting at various public ceremonies and representing the royal family. After the death of Edward VII., in 1910, he became king, taking the name of George V., while his wife took that of Queen Mary. The coronation took place in June, 1911, in Westminster Abbey, but attracted so little public interest that there was much speculation over a saying attributed to Edward VII. that he would be followed by the last king of England. The destruction by a bomb of the Lia Fail, or Stone of Destiny, for-



GEORGE V.

merly used by the kings of Ireland and Scotland, and for several centuries underlying the coronation chair in Westminster Abbey, about the time of the king's accession, added to the speculation. One of the first important acts of George V. was to visit India, where a durbar was held in 1911. During the World War the rôle played by the king was inconspicuous, and was confined largely to visiting the wounded and appearing in public on patriotic occasions. The royal couple have had five sons, and one daughter: Edward, Prince of Wales; Albert; Mary; Henry; George, and John (d.) In 1919 the Prince of Wales made a tour of the world, as his father had done previously, and visited the United States.

GEORGE I., King of the Hellenes; born in Copenhagen, Dec. 24, 1845. He was second son of the King of Denmark. In 1863 he was elected king by the Greek National Assembly. In 1867 he married the Princess Olga, a niece of the Russian czar. His conduct as a constitutional monarch was always correct and regular, and he won the popular sympathies by the efforts he made on behalf of the expansion of Greek nationality. His children were bred in the Greek faith. He was assassinated in 1913. See GREECE; BALKAN WARS.

GEORGE, Duke of Clarence, and brother of Edward IV., King of England. He espoused the cause of Henry VI. and his queen, Margaret of Anjou, against his brother and sovereign. He married a daughter of the Earl of Warwick (the "king-maker"), and joined him in his revolt against the royal authority. Being taken prisoner he was condemned to death. The unfortunate prince is said to have drowned himself in a butt of Malmsey wine in 1478.

GEORGE, DAVID LLOYD. See LLOYD GEORGE, DAVID.

GEORGE, GRACE, an American actress, born in New York City in 1880. She received a convent education and made her first appearance on the stage in 1894 in "The New Boy." She subsequently appeared in "The Girl I Left Behind Me"; "Charley's Aunt"; "Her Majesty"; "The Two Orphans"; "The Truth"; and other plays. In 1915 she established the Playhouse Company, playing repertory, in New York City. In this house were given "Major Brassbound's Conversion" and other plays. In 1899 she married William A. Brady.

GEORGE, HENRY, an American political economist; born in Philadelphia, Pa., Sept. 2, 1839; received a common school education; went to California in 1859; worked as a newspaper compositor for a number of years; became an editor in 1867, and later was connected with several California periodicals; removed to New York City in 1880. He was nominated by the Labor Party for mayor of New York in 1886; received 67,000 votes; but was defeated. In 1897 he was again nominated for mayor by several organizations united under the name of the "Democracy of Thomas Jefferson." Though urged to use caution against overwork, he began the campaign with great enthusiasm. During the night of Oct. 28, he made four addresses and retired about midnight, but soon had a stroke of apoplexy and died before morning. His publications include "Progress and Poverty" (1879); "The Land Question" (1881); "Social Problems" (1883); "Property in Land"; "Protection and Free Trade" (1886); etc.

GEORGE, HENRY, JUNIOR, an American public official, son of HENRY GEORGE (*q. v.*), born in Sacramento, Cal. At an early age he became a printer, then a journalist, and in 1883 acted as his father's secretary during an extended lecture tour in this country and abroad. In 1897, his father having been nominated candidate for Mayor of New York and dying before the election, the son succeeded him in the political campaign as candidate, but was defeated. In 1906 he was correspondent for a newspaper syndicate in Japan. In 1909 he was correspondent for Collier's Weekly in London, where he at the same time campaigned during a general election for the British budget, a political measure based on the land taxation theories of Henry George the elder. Returning home, he was elected to the United States Congress from the 17th New York District (1911-1913) and again from the 21st New York District for the 63d Congress (1913-1915). He died in 1916. He was the author of "The Life of Henry George" (1900); "The Menace of Privilege" (1905); "The Romance of John Bainbridge" (1916).

GEORGE, W. L., an English journalist and author, born in Paris, 1882, finished his education in University of Paris and in Germany, and was successively an analytical chemist, civil engineer, lawyer, soldier, and journalist. During the World War he served in the French Army. In London he became known as a clever journalist, capable of discussing a wide range of subjects. His novels include; "A Bed of Roses" (1911); "The City of Light" (1912); "The Making of an English-

man" (1914); and "The Blind Alley" (1919). He lectured in the United States in 1920.

GEORGE JUNIOR REPUBLIC, a community of boys and girls near Freeville, N. Y., about 10 miles east of Ithaca, founded in 1895 by William R. George. The purpose of the community is to afford to neglected, reckless, and unfortunate children an opportunity to acquire an education and character necessary to lead a useful life. It is the outcome of an experiment made by Mr. George for a number of years, consisting of taking between 150 and 250 children from the city slums to his country home during their vacation. The organization of the Republic is modeled upon that of the United States. The age of admission is 12 to 18 years, and children from any part of the United States may be admitted. Defectives are not admitted if their condition is known. The institution was in successful operation for many years and its success resulted in the foundation of similar establishments in various parts of the country. These were all independent of each other and of the original institution, but eventually the National Association of Junior Republics was formed. The parent establishment in New York was seriously criticized in respect to its conduct in 1913, and difficulties about meeting its budget eventually resulted in a decision of the trustees to close the institution in 1914. At that time, Mr. George's offer to take over the institution was accepted.

GEORGE, LAKE, called also **HORICON**, a beautiful lake, 32 miles long, near the E. border of New York State. It forms the head-waters of Lake Champlain, is studded with hundreds of picturesque islands, and its shores contain several favorite summer resorts, especially the village of Caldwell or Lake George. Here was fought the battle of Lake George, in which the French and Algonquins, under Baron Dieskau, were utterly defeated by the English and Iroquois under Sir William Johnson, Sept. 8, 1755.

GEORGE, ORDER OF ST., the name of numerous orders which have been founded in honor of St. George. They include (1) a military order instituted in Russia in 1769 by the Empress Catharine II. as a reward of military achievements. It consists of four classes, to which a fifth, intended for non-commissioned officers and privates, was added in 1807. (2) An order instituted in Bavaria by the Emperor Charles VII. (Charles Albert) in 1729, and reorganized by King Louis II. in 1871. Since the reorganization the order, which had previously been a mere decoration for the nobility, has devoted itself to such services as the care of the wounded on battlefields, etc. (3) An order instituted by Ernest Augustus of Hanover in 1839. (4) A Sicilian military order, instituted by Joseph Napoleon, Feb. 24, 1808, and remodeled by King Ferdinand IV. in 1819. (5) The name under which the order of the Garter was first instituted in England.

GEORGE, ST., the especial patron of chivalry, and tutelary saint of England. Though venerated both in the Eastern and Western Churches, his history is extremely obscure. The story in the "Acta Sanctorum" ("Deeds of the Saints") is that he was born of noble Christian parents in Cappadocia, became a distinguished soldier, and, after testifying to his faith before Diocletian, was tortured and put to death at Nicomedia, April 23, 303.

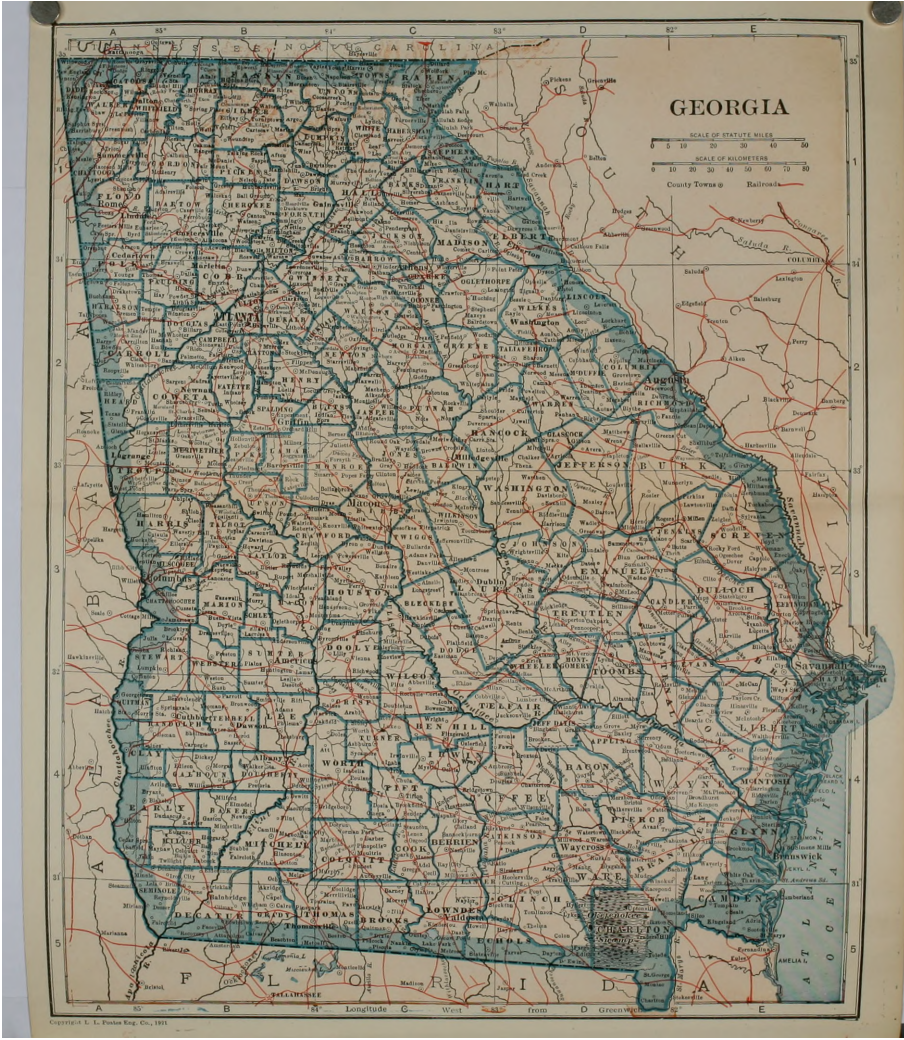
GEORGE, ST., one of the Bermudas. It is about 3 miles long and ½ mile broad, is fortified, and contains a port of the same name, which is a British military station.

GEORGE'S CHANNEL, ST., the arm of the sea which separates Ireland from Wales S. of the Irish Sea. From Holyhead and Dublin on the N. to St. David's Head and Carnsore Point it extends about 100 miles, with a breadth varying from 50 to 70 miles.

GEORGETOWN, a former city in the District of Columbia, on the Potomac river; since 1878 part of the city of Washington. It is the seat of Georgetown University, a Jesuit institution with a noted astronomical observatory. Georgetown is one of the greatest fish-markets in the country and has over 50 flour mills. See WASHINGTON (city).

GEORGETOWN (formerly the Dutch Stabroek), capital of British Guiana; on the Demerara river, not far from its mouth. It is handsomely built. The principal public edifices are the government building, the cathedral, the Queen's College, and a museum and library. There is a good harbor, with a lighthouse, and defenses erected within recent years; the foreign trade is virtually that of the colony. See GUIANA, BRITISH. Pop. (1918) 54,006.

GEORGETOWN, a city of South Carolina, the county-seat of Georgetown co. It is on the Georgetown and Western railroad and on Winyah Bay. It has an excellent harbor and is a seaport of considerable importance. It is the center of an important agricultural region.



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There are steamship connections with New York, Baltimore, and other cities. Its industries include machine shops, foundries, chemical factories, saw-mills, etc. It has an important export trade in rice, turpentine, and lumber. The notable public buildings include a public library, a post office, and a custom house. Pop. (1910) 5,530; (1920) 4,579.

GEORGETOWN COLLEGE, a coeducational institution in Georgetown, Ky., founded in 1829 under the auspices of the Baptist Church; reported at the close of 1919: Professors and instructors, 20; students, 416; president M. B. Adams.

GEORGETOWN UNIVERSITY, an educational institution in Washington, D. C., founded in 1789 under the auspices of the Roman Catholic Church; reported at the close of 1919: Professors and instructors, 205; students, 2,102; volumes in the library, 100,000; number of graduates, 8,466; president, John B. Creeden, Ph. D.

GEORGE WASHINGTON UNIVERSITY, an institution for higher education, founded in 1821, in Washington, D. C., as Columbian College. It retained this name until 1873, when it was incorporated as Columbian University. In 1904, with several other educational institutions, it was merged under the name of George Washington University. There were in 1919 2,654 students and 275 instructors. President, W. M. Collier, LL.D.

GEORGIA, a State in the South Atlantic division of the North American Union; bounded by North and South Carolina, Tennessee, Alabama, Florida, and the Atlantic Ocean; area, 59,475 square miles; one of the original 13 States; number of counties, 137. Pop. (1910) 2,609,121; (1920) 2,895,832. Capital, Atlanta.

Topography.—The surface of the State is irregular, rising in terraces. The coast for about 20 miles inland is low and swampy; from here it rises about 100 feet in 20 miles, till, in Baldwin county, about 200 miles from the sea, an elevation of 600 feet is reached. The foot hills and mountains begin here and extend toward the W. and N. W., reaching an altitude of 2,500 to 4,000 feet. In the extreme S. E. is the Okefinokee Swamp. A line of islands averaging about 10 miles in width extends along the coast and affords many safe but shallow sounds. The only harbors of large size are Savannah, St. Mary's, Darien, and Brunswick. The State is well watered. The principal rivers are the Savannah, forming the boundary between Georgia and South Carolina, the Ogeechee, the Cannouchee, the Altamaha, the Satilla, and the St. Mary's, running to the Atlantic; and the Withlacoochee and Allapaha uniting in Florida to form the Suwanee, the Ochlockonee, and the Flint and Chattahoochee forming the Apalachicola, at the Florida line, flowing directly into the gulf.

Geology.—The rocks of the N. part of the State are mostly of metamorphic or crystalline formation and include granites, gneisses, sandstones, and schists. A belt of Silurian origin extends through the N. W. counties with frequent outcrops of Devonian structure. There are extensive coal measures in the extreme N. W. In central and most of southern Georgia the metamorphic rocks are overlaid with Tertiary deposits, and farther S. and E. these are themselves overlaid with Quaternary sands and clay. A Tertiary strip borders the ocean, and a Cretaceous deposit occurs in the vicinity of Jefferson county.

Mineralogy.—The State is rich in mineral resources, especially in the mountain regions N. of the Chattahoochee, and ranks second in the United States in the production of manganese; silver, emery, bituminous coal, antimony, granite, graphite, marble, magnetic and specular iron ore, zinc, limonite, tellurium, galena, mica, roofing slate, pyrites and potter's clay abound. Gold is found in seams of quartz, in veins, and in the disintegrated sands and gravel. It was discovered in 1828 in White co., and led to the forcible removal of the Cherokee Indians. The coal production in 1918 was 66,716 tons, valued at $239,377. Georgia marble has a high reputation. The clay-working industries have a product of about $2,000,000 annually. There is a small amount of gold produced. The total mineral output is valued at about $5,000,000 per year.

Agriculture.—In the N. part of the State the principal crops are wheat, corn, sorghum, oats, rye, potatoes, apples, peaches, and other temperate fruits, grains and vegetables, while middle and southern Georgia are devoted chiefly to upland cotton and sugar-cane. The acreage, value, and production of the principal crops in 1919, was as follows: Corn, 4,820,000 acres, production 69,890,000 bushels, value $111,824,000; oats, 540,000 acres, production 10,800,000 bushels, value $12,420,000; wheat, 240,000 acres, production 2,520,000 bushels, value $6,628,000; hay, 557,000 acres, production 613,000 tons, value $15,509,000; peanuts, 202,000 acres, production 5,050,000 bushels, value $12,423,000;

potatoes, 23,000 acres, production 1,610,000 bushels, value $3,494,000; sweet potatoes, 142,000 acres, production 13,064,000 bushels, value $14,370,000; cotton, 5,288,000 acres, production 1,730,000 bales, value $309,670,000; tobacco, 31,000 acres, production 16,430,000 pounds, value $3,532,000.

Manufactures.—There were in 1914 4,639 manufacturing establishments in the State, employing 104,461 wage earners. The capital invested amounted to $258,326,000; the wages paid to $38,128,000; the value of materials used to $160,089,000; and the value of the finished product to $253,271,000. The manufacturing is principally carried on in Atlanta, Augusta, Savannah, Macon, and Columbus. The chief articles of manufacture are cotton goods, lumber-mill products, flour and grist, cotton-seed oil, foundry and machine shop products, fertilizers, naval stores, railroad cars, brick and tile, wagons and carriages, clothing, furniture, hosiery, and leather goods.

Banking.—In 1919 there were 93 National banks in operation, having $12,258,000 in capital, $10,422,000 in outstanding circulation and $50,875,000 in U. S. banks. There were also 653 State banks, with $29,264,000 capital and $21,485,000 surplus. In the year ending Sept. 30, 1920, the exchanges at the United States clearing-houses at Atlanta aggregated $3,204,770,000, an increase over the previous year of $1,855,484,000.

Education.—The school population in 1918 numbered 841,861. There were enrolled in the public schools 679,747 pupils, with an average daily attendance of 452,064. There were 15,172 teachers. The total fund paid for public schools was $7,619,267, and the total for educational purposes, including colleges and secondary schools, amounted to nearly $10,000,000. The institutions for higher education include the University of Georgia, at Athens; the Georgia School of Technology; and the North Georgia Agricultural College.

Churches.—The strongest denominations in the State are the Baptist, Methodist Episcopal, Presbyterian, Roman Catholic, and Protestant Episcopal.

Railways.—The railway mileage of the State in 1920 was about 7,400. There are about 500 miles of electric railway in the State.

Finances.—The receipts for the fiscal year 1918 were $7,686,445, and the disbursements $8,332,569. There was a balance on January 1, 1918, of $1,459,264, and on January 1, 1919, $813,139. The bonded debt of the State, in 1919, amounted to $5,918,202. The assessed valuation of real and personal property is about $1,000,000,000.

State Government.—The governor is elected for a term of two years. Legislative sessions are held annually beginning on June 25, and are limited to 50 days each. The Legislature has 51 members in the Senate and 193 in the House. There are 12 Representatives in Congress. The State government in 1921 was Democratic.

History.—Georgia was settled by a colony of 120 persons in 1733, under a patent granted to Oglethorpe, Whitefield, and the Wesleys, June 9, 1732. It was established as a barrier between the Spanish and Indians on the S. and the Carolinas on the N., and to provide a refuge for debtors, orphans, and other needy and destitute persons. In the war between England and Spain in 1739-1743, Oglethorpe made an alliance with the Creek Indians and led the combined troops of Carolina and Georgia in an invasion of Florida, and in 1742 he drove off the Spanish fleet that had attacked the forts on the Altamaha. After the peace, the Georgians demanded slaves, which had previously been prohibited. In 1752 the trustees surrendered the colony to the crown and negro slavery was introduced. At the outbreak of the Revolutionary War Georgia, having few claims for redress and no charter on which to base them, hesitated to join the other colonies, and was not represented in the Constitutional Congress in 1774. In March, 1775, St. John's parish sent a delegate to the Continental Congress, and in July all the parishes sent representatives. On July 10, 1775, a schooner commissioned by Congress captured a British ship laden with powder off Savannah. In 1778 Georgia ratified the Articles of Confederation, and in the same year the British captured Savannah, and held it till the close of the war, despite attempts by the Americans and French to retake it. In 1779 Augusta and Sunbury were taken by the British.

The first State constitution was framed in February, 1777, and on Jan. 2, 1788, Georgia unanimously ratified the Constitution of the United States. The second State constitution was adopted in 1789, and a third, by which the importation of slaves was prohibited, in 1798. There was some difficulty with the Creeks and Cherokees in 1783-1790, but treaties of peace were concluded with them in 1790 and 1791. In 1802 the Creeks ceded what is now southwestern Georgia to the United States, which in turn ceded it to the State, receiving in exchange all the State's claims W. of the Chattahoochee, or what is now Alabama

and Mississippi. The first steamship that ever crossed the Atlantic Ocean left Savannah in 1819.

In November, 1860, a State convention was called to consider the subject of secession. On Jan. 21, 1861, an ordinance of secession was unanimously passed, and Georgia ratified the Constitution of the Confederate States and adopted a new State constitution. In January, 1861, Forts Pulaski and Jackson, below Savannah, were seized by State troops, and from the battle of Chickamauga, in September, 1863, to the winter of 1864-1865 the State was constantly the scene of conflict. Atlanta was captured by General Sherman, Sept. 2, 1864, and he began his famous march thence to the sea, Nov. 15, occupying Savannah Dec. 21. Columbus, West Point, and Macon were taken in April, 1865, by General Wilson, and on May 10, 1865, Jefferson Davis was captured at Irwinville. One of the most noted Confederate prisons was located at Andersonville in this State.

Georgia repealed the act of secession Oct. 30, 1865; adopted a new constitution; and ratified the Thirteenth Amendment to the Constitution of the United States. Congress, dissatisfied with the new constitution, put the State under military rule till another constitution was ratified in 1868; and the State was restored to the Union on its ratification of the Fourteenth Amendment in 1869. On the refusal to ratify the Fifteenth Amendment the State was again placed under military rule, but reinstated on its compliance with this demand. The recent prosperity and development of Georgia's resources has been due in large measure to the Cotton Exposition, in 1881, the Piedmont Exposition, in 1887, and the Cotton States and International Exposition, in 1895, all at Atlanta.

GEORGIA (by the Russians called Grusia, by the natives Karthli), formerly a kingdom, then included in the Russian government of Tiflis. The natives are a fine-looking race, the Georgian women, like the Circassians, being celebrated for their beauty. The Georgian language, together with that of the Mingrelians, Lazes, and other Caucasian peoples, seems, according to the latest researches, to form a perfectly distinct linguistic family. It possesses a not unimportant literature, commencing with the introduction of Christianity into the country. The history of the Georgians first becomes truthworthy about the time of Alexander the Great, to whom they became subject. About 324 B. C. they gained their independence under Pharnavas. They became Christianized toward the end of the 4th century. After yielding for a time to the supremacy of the Arabian caliphs, Georgia regained its independence toward the end of the 10th century, which it retained till 1799, when Heraclius, successor of George XI., formally ceded his dominions to the Russian emperor Paul. When the Bolsheviks assumed power in Russia in November, 1917, the Georgians with Tartars and Armenians formed the Transcaucasian state. Independence was declared April 22, 1918. Out of this developed the independent state of Georgia, May 26, 1918. The Act of Independence was confirmed, and ratified by the National Council, March 12, 1919, and recognized by the Allies, Jan. 16, 1920. Georgia has an area of 35,500 square miles. It is bounded on the N. by the Caucasus, E. by Republic of Azerbaijan, S. by Armenia and S. W. by Turkey. Pop. about 3,200,000. Capital, Tiflis, pop. 347,000.

GEORGIA BARK, a small tree of the southern United States closely resembling the cinchona or Peruvian bark, and belonging to the natural order *Cinchonaceæ*. It has pretty, large white flowers, with longitudinal stripes of rose-color. The wood is soft and unfit for use in the arts. The inner bark is extremely bitter, and is employed with success in intermittent fevers.

GEORGIA, GULF OF, a large gulf of the North Pacific Ocean, between the continent of North America and Vancouver's Island; about 120 miles in length from N. to S.; the breadth varies greatly in its different parts, from 6 miles to 20. It communicates with the ocean on the N. by Queen Charlotte's Sound and on the S. by the Strait of Juan de Fuca.

GEORGIA SCHOOL OF TECHNOLOGY, an institution for higher education, at Atlanta, Ga., founded in 1888. There were in 1920 2,224 students and 100 members of the faculty. The school is supported by the State and has no endowment. The yearly income is $240,000. President, K. J. Matheson. LL. D.

GEORGIA, SOUTH, an island in the South Atlantic, lat. at its N. point, 53° 57′ S.; lon. 38° 13′ W. It is 90 miles long, and has high and rocky coasts, inaccessible from ice during a great part of the year. It abounds with seals and sea-fowl.

GEORGIA, UNIVERSITY OF, a nonsectarian State institution in Athens, Ga.; founded in 1801; reported at the close of 1920: Professors and instructors,

85; students, 1,263; volumes in the library, about 45,000; chancellor, David C. Barrow, LL.D.

GEORGIAN BAY, formerly LAKE MANITOULIN, the N. E. part of Lake Huron, partly separated from the main body of the lake by the peninsula of Cabot's Head and the island of Great Manitoulin. It is about 120 miles long and 50 broad.

GERA (gā'rä), a town of Germany, capital of the small principality of Reuss-Schleiz, on the White Elster, 42 miles E. by S. of Weimar. Nearly destroyed by fire in 1780, it is for the most part a modern town, with broad and regular streets, but its older buildings include a castle and a fine town hall. There are over a score of extensive woolen factories, besides cotton works, dyeing and printing works, manufactures of machinery, leather, tobacco, and beer for export, and four publishing houses; eight establishments, employing 1,500 hands, turn out thousands of melodeons, accordions, and jews'-harps yearly. Pop. (1919) 73,641.

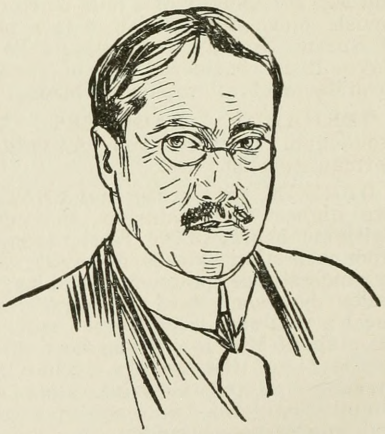
GERACE (jā-rä'che), a town of southern Italy, 4 miles from the sea, and 37 N. E. of Reggio. It has a cathedral, rebuilt after the earthquake of 1783, and a trade in wine, especially the esteemed Lacrima di Gerace. There are iron mines and a hot sulphur spring close by, and on a neighboring plain are the ruins of the ancient Locri. Pop. about 11,000.

GERANIUM, in ordinary language, a term most frequently applied to any of the cultivated pelargoniums (these belong to the *Geraniaceæ*, but are not the typical genus); also a book name, and partly a popular one, for the genus *Geranium*. In botany, the typical genus of the order *Geraniaceæ* and the alliance geraniales. *Geranium sanguineum* is a perennial plant with one-flowered peduncles. It is found in dry rocky places, on sandy shores, and on mountains. *G. sylvaticum*, *G. pratense*, and *G. pyrenaicum* are perennial, with two-flowered peduncles. Other common species are *G. molle*, *G. rotundifolium*, *G. pusillum*, *G. columbinum*, *G. dissectum*, *G. robertianum*, and *G. lucidum*. The root of geranium contains more tannin than quino does, and is a very powerful astringent. The tubers of *G. parviflorum* are eaten in Van Diemen's Land, where it is called the native carrot. Indian geranium is the name given by perfumers to *Andropogon nardus;* and the nettle geranium is *Coleus fruticosus*.

GERAR an ancient town or place of the Philistines in the times of Abraham and Isaac, in the S. of Judah, not far from Gaza.

GERARD, COMTE ETIENNE MAURICE (zhārär'), a French marshal; born in Damvillers, Meuse, France, April 4, 1773. Volunteering in the army in 1791, he served on the Rhine, in Italy, in the Vendée campaign, in Germany, and in Spain. For his brilliant services at Austerlitz (1805) he was appointed general of brigade; he also took a notable part at Jena (1806), Erfurt (1806), and Wagram (1809). During the Russian campaign of 1812 he rendered conspicuous service at the capture of Smolensk in the battle of the Beresina. After Napoleon's return from Elba he commanded a division at Ligny, and was wounded at Wavre. The second restoration compelled him to leave France, and he did not return till 1817. In 1831 he commanded the French army sent to the assistance of the Belgians against the Dutch, whom he drove out of Flanders, and Dec. 27, 1832, compelled the citadel of Antwerp to capitulate. After the July revolution of 1830 he was appointed marshal and war minister by Louis-Philippe; he was again war minister from July to October in 1834. He died in Paris, April 17, 1852.

GERARD, JAMES WATSON, an American diplomat and lawyer, born in Geneseo, N. Y., 1867. He graduated from the New York Law School in 1892. For four years he was Chairman of the New York Democratic Campaign Committee.



JAMES W. GERARD

In 1908 he was elected associate justice of the Supreme Court of New York, but resigned in 1913 on being appointed Ambassador to Germany by President Wilson. He became the center of public notice during the first two years of the World War, on account of the skill with which he represented his country in

Germany, at a time when the situation between the two governments grew gradually more and more strained. On the break between Germany and the United States, in February, 1917, he was recalled and returned to the United States. He is the author of two books based on his experiences in Berlin, both of which were widely read; "My Four Years in Germany" (1917), and "Face to Face with Kaiserism" (1918).

GERASA (jer'a-sä), in the time of the Romans a flourishing city of Palestine, situated among the mountains of Gilead, about 20 miles E. of the Jordan. Parts of the city wall are still in good preservation; two theaters and several temples can be identified, and 230 columns are still standing.

GERBI (jer'bē), or **JERBA** (jer'bä), an island in the Gulf of Cabes, off the coast of Tunis. It is about 20 miles long and 14 broad. The surface is level and fertile, and occupied by a population of about 45,000, mostly Berbers.

GERFALCON, or **JER-FALCON** (-fâ-kon), in zoölogy, the *Falco Gyrfalco*, a species of falcon considered as the boldest and most beautiful of the tribe. In size it approaches closely to that of the osprey. Its general color is brownish-gray, of varied tints above and white beneath, and brown longitudinal spots. The tail is crossed with a number of deeper and lighter bands, and the bill and legs are usually of a pale-blue or yellowish color. The gerfalcon is a native of Russia, Norway, Iceland, and Baffin's Bay. It is considered one of the most formidable of all rapacious birds.

GERHARDT, DAGOBERT VON, pseudonym Gerhard von Amyntor, a German novelist.

GERIZIM (ger'i-zim) and **EBAL**, the two highest mountains in the central Palestine chain (3,000 feet), separated from each other by a deep narrow valley, in which stands the town of Nâblus. The valley between them is very fertile. Jacob's well stands where the vale joins the plain of Moreh. On the slope of Ebal to the N. of the well is Sychar (now 'Askar). Mount Gerizim, along with Mount Ebal, was the scene of a grand and impressive ceremony, in which the whole people of Israel took part after crossing the Jordan, in obedience to a command which Moses had given them (Deut. xxvii.). The half of the tribes standing on Gerizim responded to and affirmed the blessings, those on Ebal the curses as pronounced by the Levites. The Samaritans built a temple on Mount Gerizim as a rival to that of Jerusalem, and organized a rival priesthood; and the Samaritan Pentateuch closed the Decalogue with the injunction, "Thou shalt build a temple on Mount Gerizim, and there only shalt thou worship." And, though the Samaritan temple was destroyed by Hyrcanus about 200 years after, the mountain on which it stood continued to be held sacred by the Samaritans. Subsequently, a Christian church in honor of the Virgin was built on it.

GERM, that from which anything springs; the origin, source, or first principle of anything. In physiology and botany, the earliest stage in the existence of an organized being, the embryo or bud from which such a being develops; used either of plants or of animals.

GERMAIN-EN-LAYE, ST. (san-zher-man-on-lā'), a town in the department of Seine-et-Oise, France, on a hill adjoining the Seine, 6 miles N. of Versailles, and 9 W. by N. of Paris. Manufactures, horse-hair goods and leather. It is chiefly noted for its noble palace, originally built by Charles V. in 1370; reconstructed by Francis I.; and embellished by many succeeding sovereigns, especially Louis XIV., who added to it five extensive pavilions, and constructed the fine terrace which extends from it for a distance of 1½ miles. Charles IX. and Henry II., as well as Louis XIV., were born in this palace. It was the residence of Mlle. de la Vallière; and James II. of England, with most of his family, passed their exile, and died in it. It is now used as barracks and a military prison.

The Forest of St. Germain, one of the finest of its kind in France, extends N. of the town, inclosed W., N., and E. by the Seine. It is 9 miles in length by 3 in breadth.

GERMAN, pertaining or relating to Germany; or a native or inhabitant of Germany. Also the language of the higher and S. parts of Germany; the literary language of the whole country. Old High German was spoken from the 8th to the 12th century; Middle High German from the 12th to the 15th century; Modern High German is the existing form. Low German is the name for a group of dialects spoken in northern Germany, Netherlands, and Holland.

GERMAN CATHOLICS, the name given to a body in Germany that separated from the Roman Catholic Church in 1844. Whatever might be the deeper causes of the schism, the immediate occasion of it was the exhibition of the Holy Coat at Treves. The Old Catholics may be regarded as having superseded the German Catholic movement.

GERMAN EVANGELICAL PROTESTANT CHURCH, in the United States, a religious body, liberal in doctrinal belief, having no confession of faith. Its ministers are associated in district unions.

GERMAN EVANGELICAL SYNOD OF NORTH AMERICA, a religious body, accepting the symbolical books of the Lutheran and Reformed Churches, representing in the United States the State Church of Prussia, which is a union of the Lutheran and Reformed bodies. It celebrated, Oct. 12, 1890, the semi-centennial anniversary of its organization in the United States.

GERMAN SILVER, a white alloy for tableware, consisting of nickel, copper and zinc in various proportions. The best quality consists of four parts copper, two parts nickel, and two parts zinc, but this quality is the most difficult to work. For articles which are to be cast instead of stamped or hammered about 2 per cent. of lead is added. To make a good malleable alloy, the three metals of which it is composed should all be of the best quality. German silver has a tendency to crack in ANNEALING (*q. v.*), and is all the more liable to do this if its component metals are impure. Its crystalline structure is got rid of by hammering, rolling, and annealing. It is harder and tougher than brass, and takes a fine polish. In color it is sufficiently near silver to make it valuable for plating with that metal.

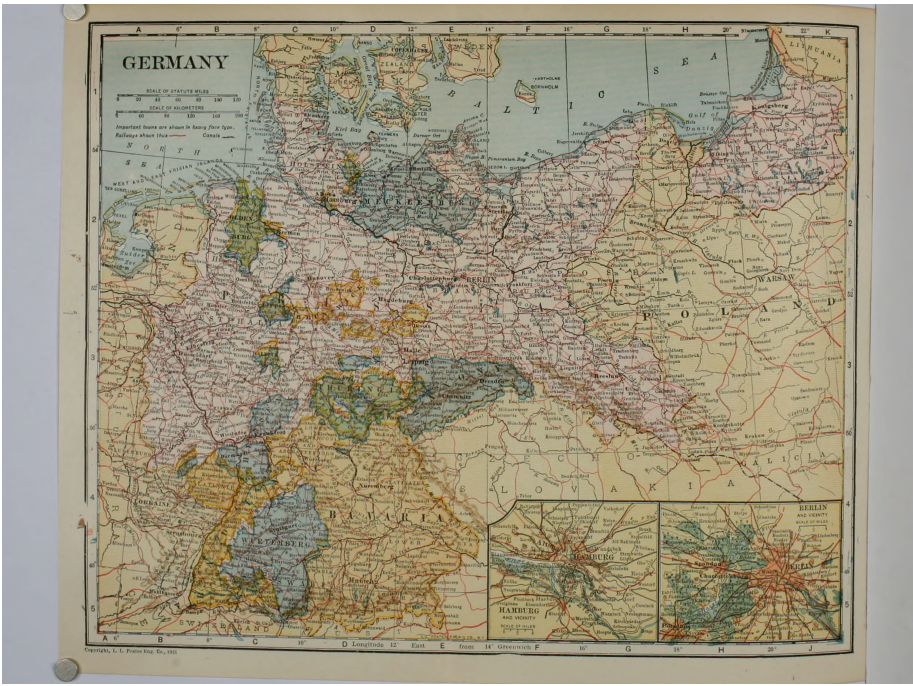
Spoons and forks of this alloy are made in immense numbers. Such articles as salvers, dish-covers, jugs, teapots and the like are also largely made of it, but these objects, or at least some of them, are still more largely made of BRITANNIA METAL (*q. v.*), a greatly inferior alloy, because much softer.

Through care in preparing a suitable alloy, large objects, such as the bodies of jugs and coffeepots, can be formed of sheet German silver by "spinning" it on the lathe, instead of by stamping or by the slow process of hammering. Formerly it was only a soft alloy like Britannia metal that could be so treated. For some time past there has been a tendency to substitute for electroplate—*i. e.*, German silver plated with real silver—white alloys having nickel for their basis.

GERMANIA, an extensive country of ancient Europe, situated E. of Gaul, from which it was separated by the Rhine. Its inhabitants were warlike and uncivilized, and always proved a watchful enemy against the Romans. Cæsar first entered their country; but he rather checked their aggressions than conquered them; and his successors, or their generals, also attempted to chastise their insolence. Tacitus has delineated their manners and customs with the greatest nicety, and has accompanied his description with the reflections of a philosopher.

GERMANICUS CÆSAR, a Roman general, the son of Nero Claudius Drusus, and of Antonia, daughter of Mark Antony and niece of Augustus; born in 15 B. C. By desire of Augustus he was adopted in the year 4 A. D. by Tiberius, whom he accompanied in the war against the Pannonians, Dalmatians, and Germans. In the year 12 he was consul, and next year was appointed to the command of the eight legions on the Rhine. In 14 he was at Lugdunum Batavorum when news came of the death of the Emperor Augustus and of the mutiny for more pay and shorter service among the soldiers in Germany and Illyricum. Germanicus hastened to the camp and quelled the tumult by his personal popularity; and at once led his soldiers against the enemy. Crossing the Rhine below Wesel, he attacked and routed the Marsi, and next year marched to meet the redoubtable ARMINIUS (*q. v.*), the conqueror of Varus and his legionaries, whose bones had lain whitening for six years in the Teutoburg Forest. With solemn rites his soldiers buried these sad relics of disaster, then advanced against the foe, who, retiring into a difficult country, managed to save himself, and was not subdued till the year after, when Germanicus again carried a part of his army up the Ems in ships, crossed to the Weser, and completely overthrew Arminius in two desperate battles. Tiberius, jealous of the glory and popularity of Germanicus, recalled him from Germany in the year 17, and sent him to settle affairs in the East, at the same time appointing as viceroy of Syria, in order secretly to counteract him, the haughty and envious Cn. Calpurnius Piso. Germanicus died, probably of poison, in Epidaphnæ, near Antioch, Oct. 9, 19. His wife, Agrippina, and two of her sons were put to death by order of Tiberius; the third son, Caligula, was spared. Of the three daughters who survived their father, Agrippina became as remarkable for her vices as her mother had been for her virtues.

GERMAN SOUTHWEST AFRICA, formerly a German protectorate in West Africa. It was captured by South African forces in July, 1915, and is now administered by the government of the Union of South Africa under mandate. It is bounded on the N. by Portuguese West Africa, Angola and Rhodesia. On the S. by Cape province, E. by Rhodesia



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and Cape province and W. by the Atlantic Ocean. Area 333,200 square miles. European population about 15,000, mostly Germans. The coast is desolate, but there are rich tracts inland. The country is apparently rich in copper and the agricultural resources have been only partly developed. Coffee is exported.

GERMANTOWN, a former village in Philadelphia co., Pa.; since 1854 the 22d ward of Philadelphia. Considerable historical interest is attached to the place. It was settled by the Germans, under a grant from William Penn, in 1684, and on Oct. 4, 1777, a battle took place between the armies under Washington and the English under Howe. After several hours of severe struggle the Americans were defeated, the loss being about equal on both sides. Germantown has many handsome residences, a National bank, historical society, St. Vincent's Seminary, Stevens School, Friends' School, and all modern city improvements.

GERMANY, or the **GERMAN REPUBLIC**, formerly the German Empire. Prior to the revolution of 1918 Germany was a constitutional monarchy, consisting of 25 federated states and an imperial territory (Reichsland). During the latter part of 1918 it was under a provisional republican government, and in 1919 was definitely constituted a republic by the constitution which went into effect in August of that year. Prior to the World War, Germany had an area of 208,900 square miles, with a population of about 65,000,000. By the terms of the Treaty of Versailles, Alsace and Lorraine were ceded to France, the greater part of the province of West Prussia was added to Poland, a part of eastern Silesia was likewise ceded to Poland, a portion of upper Silesia to Czecho-Slovakia, Memel and Danzig to the Allied countries, and Eupen and Malmedy to Belgium. The total area of the territory lost as a result of the war is about 37,000 square miles, with a population of about 10,000,000. The area of Germany in 1920 was about 171,910 square miles, with a population of about 55,000,000.

Topography. — The surface of Germany is much diversified with mountains in the E. and S. E. and low sandy plains intersected by rivers toward the sea, in the N. The mountains, a branch of the Alpine system, diverge in four directions from the Fichtelgebirge in the N. of Bavaria. The Erzgebirge, running N. E., forms the boundary between Saxony and Bohemia, and is continued E. by the Sudetengebirge, joining the Carpathian range near the source of the Oder. The Bohemian Forest range separates Bohemia and Bavaria, running S. E. for 150 miles, then N. E., joining the Sudetengebirge near the source of the Murch. The Swabian Alps, a low range extending S. W., form a watershed between the tributaries of the Rhine and the Danube. The Thuringian range runs N. W. from the Fichtelgebirge for about 50 miles, where it divides into the Hartz chain, running N., and another range, under various names, running W. to the Rhine, and separating it from the Weser. The rivers of Germany are numerous and noted for their scenic beauty. The Rhine, extending N. through the entire length of western Germany, is noted for the numerous old castles on its banks, as well as for its natural beauty. Of these architectural remains, probably the best known is the Castle of Rheinstein on the summit of an almost inaccessible rock near Bingen. The principal affluents of the Rhine are the Moselle and Meuse on the W., and the Lahn, Neckar, Ruhr, and Main, on the E. The Danube, with its tributaries, the Altmühl, Raab, Murch, Iller, Lech, Iser, and Inn, forms the largest waterway system. Among other principal streams are the Weser, formed by the junction of the Werra and Fulda; the Oder falling through the Great Haffe to the Baltic Sea, and the Elbe emptying into the German Ocean. There are also numerous lakes lying in the low plain of northern Germany between the Elbe and the Oder. The republic borders on two seas, the North and the Baltic. A number of islands lie off the Friesland coast, W. of the Weser, and are known as the Frisian Islands.

Agriculture.—The statistics of agriculture since the establishment of the republic are lacking in completeness. Prior to the war, over 90 per cent. of the area of the country was productive. There were about 65,000,000 acres of arable land, about 22,000,000 of pasture land, about 300,000 acres of vineyards, and about 36,000,000 acres in woods and forests. The area under the principal crops in acres, in 1919, was as follows: Wheat, 2,828,150; rye, 10,789,235; barley, 2,815,217; oats, 7,482,197; potatoes, 5,451,982. These areas are considerably less than those under crops prior to the war. The total yield of products in 1918 in metric tons (1 metric ton equals 2,204 pounds) was as follows: Wheat, 2,169,169; rye, 6,100,144; barley, 1,910,363; oats, 4,453,688; potatoes, 21,449,186; beets, 16,877,520. The product is less than 50 per cent. that of 1912. The crop conditions in the autumn of 1919 were less satisfactory than had been expected. The forest industry in Germany is very important. In normal peace times there were about 26,000,000 cubic

yards of lumber produced, and about 23,000,000 cubic yards of firewood.

Mineral Production.—The chief mineral producing portion of Germany is Prussia, where the chief mining districts are Westphalia, Rhenish Prussia, and Silesia for coal and iron; the Hartz for silver and copper; and Silesia for zinc. There are coal, iron, and silver mines in Saxony. Through the Treaty of Peace, Germany lost the great Sarre coal basin, the product of which is to go to France for 15 years.

The industries of Germany depend largely upon the coal production, and the shortage of fuel in 1919-1920 proved a very serious factor in the re-establishment of industrial operations. In spite of careful rationing, factories were obliged to cut down. Railroad and gas works reserves were reduced, and dwellings were unheated. In addition to the coal required for domestic use, Germany was obliged to furnish to France a large amount monthly in return for the destruction of the coal mines in northern France. The coal production in Germany for August, 1920, the best month following this agreement, was 11,637,000 tons, or 730,000 tons less than before the war. There were deducted about 2,700,000 tons, leaving a total of about 9,000,000 tons to be applied to domestic uses. The use of lignite, of which there are large deposits in Germany, was greatly developed, and there are indications that the production of this coal would more than equal the reduced supply available. Experiments were carried on in 1920-1921 for the production of liquid coal, and these were so successful that there was every indication that a method would be discovered to reduce coal to a liquid form. The effect of the lack of fuel to industry is shown by the falling off in the pig-iron production which in July, 1920, was 526,000 tons, and in October, 1920, 490,000 tons. In general, the coal supplied to zinc, copper, and lead mines was scarcely more than enough to keep the mines in operation.

Iron is produced chiefly in Prussia, Bavaria, and Saxony. Steel is made in Rhenish Prussia. The total production of pig iron in 1918 was 11,754,542 tons, compared with 19,291,920 tons in 1914. Detailed figures of production in other metals were not available in 1921.

Production and Industry.—The industrial condition of Germany is indicated to a large extent in the previous paragraphs on agriculture and mineral production. While manufacturing had revived to a large extent from the war conditions, the financial and economic position of the country made it almost impossible to arrive at even an approximate indication of the real industrial conditions. Many of the large manufacturing corporations showed satisfactory dividends on paper, but the depreciation of the mark made impossible an accurate determination of just what profits were resulting from manufacture. All items of cost had greatly increased in 1920 over pre-war cost; labor about three times, coal much higher, and many other supplies and requirements ran as much as ten times the pre-war cost.

Commerce.—Germany has since 1879 pursued a protectionist policy in her commercial relations. Nearly half of the imports are subject to duty and the duties levied in 1919 amounted to over 20 per cent. of the value of imports subject to duty. There was considerable demand for agricultural implements, especially to Poland, but the factories, on account of their diminished power of production, were unable to fill more than 50 per cent. of the orders. Foreign trade, except with the countries bordering on Germany, was practically at a standstill. During the first 10½ months since the signing of the armistice, the United Kingdom exported to Germany goods to the value of over $80,000,000, and received from Germany goods valued at $1,087,000. There were very large exports to Germany of American pork, beef, and other food products, in October and November, 1919. These products, with cotton and leaf tobacco, constituted the bulk of the United States exports to Germany. The imports from the United States during the fiscal year 1920 amounted to $202,176,079, while the exports to the United States were valued at $45,085,975.

Communications.—The total length of railway lines in Germany is about 39,000 miles. On April 1, 1920, all the various German state lines were transferred to the central government. About 36,000 miles are state lines. The canal system is of great importance. The Kaiser Wilhelm or Kiel Canal connects the North Sea with the Baltic, and is over 60 miles long. The Hohenzollern Canal between Berlin and Hohensaaten, was opened in 1914. Another important canal is the Elbe-Trave Canal. The post and telegraph service are in the hands of the central government. There are over 150,000 miles of telegraph line and over 80,000 miles of telephone line.

Finances.—In 1919 the revenue and expenditure were estimated to balance at £2,832,700,000. The revenue in 1918 was £3,824,062,100, and the expenditure was £3,950,502,500. The budget estimates for 1920-1921 are, for revenues 25,300,000,000 marks, and for expenditure 24,200,000,000 marks. The total funded debt in

1919 was 93,719,974,200 marks. On October 1, 1919, the total loan credits to the German Government amounted to 90,400,000,000 marks. On April 1, 1920, the public debt was increased to 204,000,000,000 marks. The German war debt is 517,700,000,000 marks. The annual interest on this amounts to about 7,900,000,000 marks.

Army.—The total mobilized strength of the army on the date of the armistice of November 11, 1918, was approximately 6,000,000 men. This force was demobilized and toward the end of January, 1919, the president of the republic was authorized to raise a provisional national defense army, pending the creation of a permanent defense force. On August 1, 1919, this force numbered 500,000 men. The Treaty of Versailles provided for a total number of effectives in the German army of not more than 200,000, on April 10, 1919. This was to be gradually reduced to 100,000 men. Universal compulsory service was abolished, as were the German General Staff and all similar organizations. The reduction of the defense force began in August, 1919. During this year, however, a number of organizations came into existence on a pretext that they were required to maintain public order. This included Public Safety Police, the Emergency Volunteers, and the Civic Guards. In all, they numbered about 500,000 men. The raising of these forces was contrary to the Treaty of Versailles, and after April 10, 1920, only civil guards and police forces, as existed in 1913, were permitted.

Navy.—The German navy ceased to exist as a fighting force under the terms of the treaty of peace. The sinking of the ships at Scapa Flow on June 21, 1919, practically put an end to what had been the German High Fleet. Ten battleships, five battle cruisers, and five light cruisers were sunk. Three light cruisers were beached, and 30 destroyers were sunk and 18 were beached. The remaining vessels of the fleet were surrendered to the Allies. The Treaty of Peace permits the German government to maintain a navy on a volunteer basis. The fleet may consist of six battleships, six battle cruisers, 12 destroyers, but no submarines are to be built. The total personnel must not exceed 15,000.

Education.—Education is compulsory throughout the country. There are about 65,000 public elementary schools, with about 10,500,000 pupils. There are also about 500 private schools. Above the elementary schools rank the middle schools of the towns. Children of the working classes may continue their education at continuation schools. The gymnasiums are fully equipped classical schools, preparing pupils in a nine-year course for the university and the professions. There are also higher schools. There are eleven technical high schools, agricultural high schools, and other professional schools. There are in Germany 23 universities.

Colonies.—Germany lost all her colonies, either by conquest or as a result of the conditions of the Treaty of Peace. These include Togoland, Kamerun, German Southwest Africa, German East Africa, New Guinea, the Caroline Islands, the Marshall Islands, the Ladrone Islands, the German Samoan Islands, and Kiau-chau-China. These colonies had a total area of 1,139,877 square miles and a population of 12,968,329.

Government.—On Nov. 9, 1918, the German Emperor abdicated and Germany became a republic from that date. For an account of the formation of the republic see HISTORY below. The constitution was adopted on July 31, 1919, by the National Assembly at Weimar and was promulgated on August 13, 1919. The constitution provides for a central and state legislature, the central authority to have power over foreign relations, defense, customs, duty, taxation, and railroad service, makes provision for an imperial council, to be formed of the representatives of the component states, and provides for suffrage. All bills, before they are introduced into the Reichstag require the assent of the Reichsrat or the imperial council. The principle of the referendum is provided for in the constitution. Members of the Reichstag are elected by universal, equal, direct, and secret votes. The Reichstag is elected for four years. The president of the republic is elected by the entire German people for a period of seven years. Declarations of war and peace are made by the central government. The Reichsrat consists of 63 members, and the Reichstag, in 1920, of 423 members. The National Assembly, on February 11, 1918, elected Friedrich Ebert president of the republic.

History.—What is now the German republic was originally divided among a number of independent races—the Alemanni, Franks, Saxons, Slavs, Avari, and others. Charlemagne conquered these various tribes, and incorporated them in his vast empire, and the treaty of Verdun, signed in 843 by the sons of Louis-le-Debonnaire, gave birth to the Kingdom of Germany. On the extinction of the Carlovingian family, the monarchy became elective, and the crown was conferred, in 911 on Conrad I., Duke of Franconia. The Saxons renewed, in the person of Otto the Great, the empire

of Charlemagne, giving it the name "The Holy Roman Empire of the German Nation." The Saxon dynasty added to the empire Lotharingia, Bohemia, and Italy; and to this family succeeded that of Franconia, which reigned from 1024 to 1137, and added the Kingdom of Arles to the possessions of the empire. The house of Suabia next succeeded, and, of this line, Conrad III., and Frederick Barbarossa, from 1138 to 1190, raised the imperial power to its utmost height. On Conrad IV.'s death commenced the long interregnum from 1254 to 1273, which ended in delivering Germany from anarchy by Rudolph of Hapsburg. The Golden Bull or charter was granted to the feudatories and electors by Charles IV. in 1356, and in 1438 Albert of Hapsburg was elected emperor and became the head of the present house of Austria. Under Ferdinand II., the Thirty Years' War began in 1618, resulting in the confirmation of the Lutheran religion. The reigns of Leopold I. and Charles VI. were occupied with long wars with Louis XIV. and XV. of France; and the death of Charles, in 1740, gave rise to the War of the Austrian Succession, which secured the throne to the husband of Maria Theresa, Charles' daughter, and thus placed on the throne a member of the House of Lorraine, Francis I. Napoleon I., who since 1799 had directed the foreign policy of the French nation, not satisfied with this reduction of the power of the empire, now conceived the idea of effecting its entire dissolution. The treaty of Pressburg, in 1805, which followed the battle of Austerlitz, gave him the means of carrying this project into effect, by forming a confederation of German princes, called the Confederation of the Rhine, who, uniting into a corporate body, in 1807 placed themselves under the protectorate of the French emperor. The wars which followed gave Napoleon the power of altering the territorial distribution of Germany at pleasure. He accordingly created for his brother Jerome the new kingdom of Westphalia, and for his brother-in-law, Joachim Murat, the grand-duchy of Berg, and raised those members of the Rhenish confederation who supported his cause to new dignities and an openly recognized independence of sovereigns. Under the circumstances, the emperor, Francis II., by a solemn act, renounced the style and title of emperor of Germany, Aug. 6, 1809. The termination of the war with Russia, called in Germany the Liberation War, restored Germany to its geographical and political position in Europe, but not as an empire acknowledging one supreme head. A confederation of 35 independent sovereigns and 4 free cities replaced the elective monarchy, that fell under its own decrepitude. A national government was recognized in 1848, and Archduke John, of Austria, was elected Vicar, but he frustrated all energetic moves on the part of the Parliament. In 1850 Austria and Prussia combined to restore the Diet, but in 1866, the Bund was dissolved and war broke out between these states. By the treaty of Prague, Aug. 20, 1866, Austria was excluded from participation in the new organization of German states, and was forced to pay 40,000,000 thalers for the expense of the war. In 1870 the Franco-German War broke out between France and Prussia, resulting in the defeat of France, the cession of Alsace-Lorraine to Germany, and the consolidation of all the German states into the German Empire. On Jan. 18, 1871, William, King of Prussia, was proclaimed first Emperor of Germany, at Versailles. An offensive and defensive alliance was formed between Austria and Germany in 1879, and later Italy entered, forming the Triple Alliance. During the difficulties between the European powers with the United States and China in 1900-1901, Germany bore a conspicuous part, and Field-Marshal Count von Waldersee was appointed commander-in-chief of the international military forces. In the first years of the twentieth century, the keynote of the German foreign policy was a growing hostility toward Great Britain, which had for its causes commercial rivalry and resentment at the conduct of the Emperor at the outbreak of the South African War. Germany was entirely neutral during the Russo-Japanese War, but took advantage of the Russian defeat to antagonize France and Russia by attempting interference with the policy of France in Morocco. In the early months of 1905 war with France seemed imminent, but the Anglo-French agreement held fast and Germany was obliged to yield at the conference held at Algeciras, in 1906. The annexation by Austria of Bosnia and Herzegovina in 1908, threatened war against Austria by Serbia and Russia, but the announcement that Russia would support Austria, prevented hostilites and enabled Austria to maintain her action. Measures providing for electoral reform were passed in 1910. By a treaty made in 1911, Russia and Germany agreed as to their relative rights in the Near East. Germany's influence was to continue along the Bagdad Railway, while Russia was given supremacy in north Persia and Kurdestan. In this year there was also a second controversy with France over the question of Mor-

occo. England supported France, and Germany was obliged to acknowledge the supremacy of French claims. In return, France ceded to Germany 112 square miles in the French Congo. Rapid increase in the war armament in the years preceding the World War made it necessary to levy special taxes on property value and incomes. The military system received severe criticism in 1913, owing to disturbances at Zabern, in which German officers were found to have acted with great brutality toward the people. The outbreak of the World War found Germany well prepared from a military standpoint. Indeed, there was abundant evidence to show that for 30 years previous economic and military preparations had been made for a great European war, and that only the opportunity was lacking. This was furnished by the assassination of the Crown Prince Ferdinand, on June 24, 1914.

The details of the part played by Germany in the World War are told in the article of that title.

The nation was well united at the outbreak of the war, and the first war loan of 4,505,000,000 marks was easily raised. All political parties supported the war. With the beginning of 1915 the question of regulating the food supply became important, and the food question continued throughout the years following to be the most acute of the domestic problems of the country. Political opposition to the war developed in 1916, when a split was brought about in the ranks of the Social Democratic party. The opposition was led by Carl Liebknecht, who on January 13, 1916, was expelled from membership in the party. Liebknecht was later arrested and imprisoned. The question of possible terms of peace continued throughout 1916. The Socialists opposed the annexation of any territory, while the Supreme War party insisted upon annexation of all conquered territory. At the beginning of 1917 war appropriations had reached the total of 40,000,000,000 marks. There were during this year a number of important cabinet changes, the most important of these being in the navy department, where Grand Admiral von Tirpitz, who had inaugurated and ardently supported the submarine campaign, was succeeded by Admiral von Capelle.

Political conditions during 1917 rapidly grew more acute. The position of the Chancellor, Bethmann-Hollweg, became continually more difficult. The condition was rendered more complicated by the revolution in Russia, which raised a demand for electoral reforms in Germany. These were promised by the Emperor and by the Chancellor. The opposition to the conduct of the war grew serious and was led by Mathias Erzberger. He attacked the government for antagonizing the United States, and for its erroneous predictions in regard to the successful conclusion of the war. A demand for peace continued to grow. Bethmann-Hollweg resigned on July 14, 1917, and was succeeded by Dr. George Michaelis, who in turn was succeeded on November 1, 1917, by Count George von Hertling. There was great dissatisfaction in the military party over the terms of peace with Russia. The reactionary, or military element, was strong enough to defeat the reform measures undertaken by the government. They also strongly insisted upon a dictated peace, involving the annexation of large parts of Belgium and France, and the payment to Germany of a vast indemnity. This party was strongly opposed by the Socialists, and there were other indications that the people were becoming restless. This unrest was increased by the uncompromising attitude taken by the Chancellor toward conciliatory speeches made by President Wilson and Lloyd George. In March, 1918, there was published the so-called Lichnowsky memorandum which revealed the unsuccessful attempts of the former German ambassador at London to prevent war.

The failure of the final German drive in spring of 1918 brought about a reversal of the government's position in regard to peace terms. The Chancellor in July declared that Germany did not intend to hold Belgium permanently. There were also many signs of dissension between the separate German states and between Germany and Austria. In September separate peace overtures were made with Belgium. Von Hertling resigned on September 29, 1918, and Prince Max von Baden became Imperial Chancellor. On October 5, he appealed to the President of the United States, asking him to take steps to bring about peace, and on October 21, sent another note to President Wilson describing the changes that had been made in the German Government and claiming that the Government was now in complete accord with the principle of representation of the people. The note also stated that orders had been issued to all German submarines to cease the torpedoing of passenger ships. President Wilson replied on October 23, expressing his willingness to consider the question of an armistice. The discussion was carried on in the German Reichstag during the weeks following. In the meantime, an armistice had been signed between Austria and Italy, and political unrest in

Germany was becoming very intense. On November 5, the German Government received the Allied answer to the request of an armistice, and after negotiations between the Allied and German military officers, an armistice was finally signed on November 11, 1918.

The signing of the armistice could not prevent the spread of revolution in Germany. Actual revolution was begun by the revolt of the German High Sea Fleet at Kiel, and was followed by uprisings in various cities throughout the Empire. On November 9, 1918, the German Emperor decided to abdicate. The final abdication was not published, however, until the end of the month, following the Emperor's flight into Holland. The revolution now swept with great swiftness. The King of Bavaria was forced from his thrown and a Socialist journalist, Kurt Eisner, was placed at the head of the newly formed republic. In quick succession followed revolution in Württemberg, Saxony, Oldenburg, Mecklenburg, and Baden. The reactionary party made an attempt at resistance throughout the country, but finally the more moderate wing of the Socialists, headed by Ebert, Landsberg, and Scheidemann, assumed the supreme power. Ebert was temporarily appointed Imperial Chancellor. This provisional government was faced by many difficult problems. The extreme radical Socialists, known as the Spartacan group, put themselves in direct opposition. This party was headed by Dr. Liebknecht, who issued a call to arms for a social revolution. There was a general demand for an all-German National Assembly, and this was finally accomplished on November 25. It was composed of 17 delegates, representing 21 German states, and its object was to formulate the rules for the coming national convention.

During the last November and early December days of 1918, political conditions continued more intense. Strikes occurred in many industrial centers. Opposition to the Ebert government was strong in Bavaria and other south German states. The Spartacan party continued in hostile opposition. People's councils and soldiers' and workmen's councils sprang up throughout the country. On Dec. 16, 1918, the central council of delegates from soldiers' and workmen's councils met in Berlin for the purpose of debating the place of national assembly. Liebknecht took this opportunity to incite the people to revolt. The radical Socialists insisted that Germany should be formed into one single republic, that all power should be given to the soldiers' and workmen's councils, and that the supreme executive power should be exercised by the executive council. It was finally decided by the Congress that elections should be held to appoint a National assembly on January 19, 1919. The Spartacan party received assistance from Russia and was also encouraged by the continued spread of strikes throughout the country. The Spartacans finally broke out in actual revolt in January. It was, however, quickly suppressed. On January 16 Carl Liebknecht and Rosa Luxemburg, the two most prominent leaders of the Spartacans, were arrested and shortly afterward shot by their guards in their place of detention. This broke the opposition of the radical Socialists.

Elections were held for members of the National Assembly on January 19, 1919, and the Assembly convened at Weimar on February 6. On February 21, 1919, there was a serious outbreak at Munich. Kurt Eisner, the Prime Minister, was killed. There were similar outbreaks throughout the country. Eisner had been at the head of a so-called Soviet government, and the collapse of this at his death removed the last stronghold of Bolshevism in Germany, although there continued to be uprisings of the Spartacans from time to time. By the time of the meeting of the Peace Conference, however, comparative peace reigned throughout Germany.

The terms of the Peace Treaty aroused a storm of protest throughout Germany. The German delegates left the conference to consult with the German Government. An extension of time was granted for the signing of the treaty, and finally on June 23, 1919, the National Assembly accepted, without conditions, the reservations of the Allied terms. The Peace Treaty was ratified by the German National Assembly on July 9, 1919. The new constitution was formally adopted by the Assembly on July 31, 1919. The constitution consists of 181 articles. It provides for the composition and function of the National government; for the regulation of the National government and the various State governments; for the election and function of the Reichstag, of the National President, of the Chancellor, of the National ministers, of the National Council, and of the duties of the various National government departments. This provides also for the administration of justice, the fundamental rights and duties of the citizens; for the regulation of marriage, education, religion, and economic life; of the temporary varying of existing laws and regulations; for the repeal of the constitution of the former German Empire; and for the con-

tinuation of German laws and regulations in so far as they do not contradict the new constitution.

The people accepted the new constitution with comparative calmness. There continued to be, however, internal dissensions and industrial troubles. On January 13, 1920, a mob of 50,000 persons gathered in front of the Reichstag building, and overwhelmed the military guard. The police were obliged to use bombs and machine guns to suppress the riot, and over 40 persons were killed. A counter-revolution against President Ebert's government, inspired by Pan-Germans, suddenly broke out on March 13. Wolfgang Kapp proclaimed himself chancellor. President Ebert fled to Stuttgart, but immediately proclaimed a general strike of workmen, which spread throughout the country, stopping all transportation and cutting off food and water for the cities. Dr. Kapp resigned on March 17, and Gustav Noske, Minister of Defense, assumed charge of the government. President Ebert returned on March 21. The radical elements among the workmen began a second revolution in the industrial centers. They captured Essen and other towns and demanded the resignation of Noske. The Ebert government agreed to this and the rioting ceased. Elections were held on June 6, 1920, for the first Reichstag under the republican government. The majority Socialists won 112 seats, the Independents 81, the Centrists 67, and the German Nationalists 65. The Reichstag, on July 31, passed a bill abolishing compulsory military service. The government ordered general disarmament of the civilian population and this was carried on throughout the remainder of the year.

The Allied Powers found considerable difficulty in enforcing the terms of the Treaty of Peace. The question of reparations was the most difficult. Germany insisted on being told the exact amount which would be exacted and the terms upon which it was to be paid. The Allied governments, however, refused until February, 1921, to give explicit terms. It was then announced that the sum of the indemnity would be practically 59 billion dollars, to be paid during an indefinite period. A meeting was held in London in March, 1921, to consider the method of payment and German delegates were invited to be present. They protested against this sum levied upon Germany, and proposed instead an indemnity of about $7,000,000,000. This proposal was rejected by the Allies and the German delegates withdrew. Following this, the Allied forces, composed chiefly of French troops, marched into Germany, taking possession of the cities of Düsseldorf, Duisburg, and Ruhrort. This occupation was accomplished without any hostility on the part of the inhabitants of these cities.

The German Emperor, having fled into Holland, for several years resided at the Castle of Amerongen, under the protection of the Dutch Government. He afterward purchased an estate at Doorn. The Crown Prince had fled to the island of Wieringen, where he remained a practical exile, although he was permitted from time to time to visit his father and mother. See WORLD WAR; PEACE TREATY, and the articles on the various German states.

GERMERSHEIM (ger'mers-hīm), a town of the Bavarian Palatinate, occupying a marshy site on the left bank of the Rhine, 8 miles S. S. W. of Spires. Founded in 1276, it fell into the hands of the French in 1644, 1674, and 1688; and in 1793 the Austrians here defeated the French.

GERMINAL (zhār-mi-näl'), the 7th month of the first French republican calendar, March 21—April 19.

GERM THEORY OF DISEASE, the theory that certain diseases are communicated from an infected person to an uninfected one by living organisms which gain access to the body of the afflicted person by the air or food, or drink, and which, growing and multiplying in the body they invade, produce the changes characteristic of the particular disease. The period during which the living particles of contagious matter retain their vitality, like the rate of their growth and multiplication, varies in different cases, but it is limited in all. Few, if any, resist the destructive influence of a temperature of 300° F., while most succumb at the temperature of 200° or even less, particularly if exposed for some time. Animal poisons generally are destroyed by boiling, and clothes, sheets, etc., infected, may be rendered pure by being exposed to a temperature of 300° F. These living organisms are grouped together as microbes or micro-organisms, and are divided into different classes. The micrococcus is a round form about the 32,000th of an inch in size, and multiplies by fission. The bacterium is rod-shaped, about the 10,000th of an inch long, with rounded ends; it also multiplies by fission. The bacillus is a third form also rod-shaped, and somewhat larger than the bacterium. They often form long chains or threads, and increase by division and by spore formation. Vibrio and spirillum are somewhat similar forms; and, like the others, increase with

a rapidity beyond conception. The connection between these micro-organisms and the various forms of zymotic disease has been thoroughly established.

The only method of investigation that yields reliable results is to separate the organisms supposed to be the cause of the disease, and cultivate it outside of the body. Thus a drop of blood from a person suffering from a special disease, which contains the bacteria, or bacilli, etc., believed to be the producers of the disease, is placed in a flask containing a nourishing material, care having been taken to destroy all other organisms in the flask. The special microbe flourishes there, let us suppose. It is then cultivated in one flask after another through successive generations, only a single minute drop of the material in one flask being used to inoculate a succeeding one. In this way a pure cultivation is obtained, a cultivation, that is, containing the particular microbe and none other. If this is the true cause of the disease, then a drop of the solution containing it introduced into the body of an animal capable of the disease ought to produce it, and the particular organism introduced should be found multiplying in the blood and tissues of the infected animal. Such a demonstration has been given of the cause of a few diseases. Dr. Koch, of Berlin, published in 1876 a paper giving a full account of the life history of the bacillus organism which had been observed in animals dead of splenic fever; and in 1877 the great French chemist, Pasteur, proceeded to investigate the subject, and his investigations conclusively support the germ theory of disease. In 1882, Dr. Koch, of Berlin, announced the discovery of a micro-organism in tuberculosis, a disease believed to be the chief, if not the only, cause of consumption of the lungs. These microbes are found not only in the lungs of persons who have died of tubercle, but also in the spit of tubercular and consumptive patients, and multiply also by spores. After the epidemic of cholera in Egypt in 1883, which spread to France and Italy, investigations were undertaken by French, German, and British commissioners.

All investigation, however, seems to point to the fact that every infectious or contagious disease is due to some form of micro-organism, and that there is one particular organism for each particular disease. Each organism produces its own disease and none other; and the special disease cannot arise unless its germ has gained entrance to the body. The channels through which these germs obtain entrance are innumerable, but they have one origin and one only, and that is a preceding case of disease. The "germ theory" affords the hope and suggestion of a method of diminishing, if not of getting rid of, such diseases altogether, and to some extent also indicates the direction in which their cure is to be sought.

GÉRÔME, LÉON (zhā-rōm′), a French painter; born in Vesoul, France, May 11, 1824; and in 1841 entered the studio of Paul Delaroche at Paris, at the same time attending the School of Fine Arts. In 1863 he was appointed Professor of Painting in the School of the Fine Arts. His first great picture, "The Age of Augustus and the Birth of Christ," was exhibited in 1855; and four years later his "Roman Gladiators in the Amphitheater" gained him great reputation, that was still further enhanced by "Phryne Before Her Judges" (1861). In the same year he exhibited, "Socrates Searching for Alcibiades at the House of Aspasia," "The Two Augurs," and a portrait of "Rachel." "Louis XIV. and Molière," "The Prisoner," "Cleopatra and Cæsar," "The Death of Cæsar," "The Plague at Marseilles," "Death of St. Jerome," "Lioness Meeting a Jaguar," and "The Gray Heights" (1874), are among the best known of his subsequent works. He died at Paris, Jan. 10, 1904.

GERONA (hā-rō′nä), a city and capital of the province of Gerona, Spain; 65 miles N. E. of Barcelona. It contains a beautiful Gothic cathedral of the 14th and 15th centuries. The inhabitants carry on the manufacture of paper, cork-cutting, spinning, and weaving. The town was formerly a place of great strength, and has undergone several notable sieges, particularly in 1653, 1684, 1694, 1706, and 1809, on each occasion by the French. Pop. (1918) of province 330,153; of city, about 16,000.

GERONTES (ge-ron′tēz), a number of magistrates of Sparta who, with the ephors and kings, had the supreme power in the State. They were not eligible to office before they had attained the age of 60 years. Their number is variously stated at 20 and 32.

GEROULD, KATHARINE FULLERTON, an American writer, born in Brockton, Mass., in 1879. She graduated from Radcliffe College in 1900. She was on the faculty of Bryn Mawr from 1901 to 1910. Her published writings include "Vain Oblations" (1914); "The Great Tradition" (1915); "Modes and Morals" (essays) (1919). She was a frequent contributor of stories, essays, and verse to magazines.

GERRY, ELBRIDGE, an American statesman; born in Marblehead, Mass., July 17, 1744; was a member of the Continental Congress in 1776-1780 and 1783-1785; delegate to the Constitutional Convention in 1789; member of Congress from Massachusetts, in 1789-1793; commissioner to France in 1797-1798; governor of Massachusetts in 1810-1812; and Vice-President of the United States in 1813-1814. It was during his term as governor that an unsatisfactory redistricting of the State took place, in which he was supposed to have taken part, whence arose the term "gerrymander," now generally applied to the process of so arranging electoral districts as to give a majority of Congressmen, or State Legislators, as the case may be, to the party having the minority in the total popular vote of the State. He died in Washington, D. C., Nov. 23, 1814.

GERRY, PETER GOELET, a United States Senator, born in New York, 1879; graduated from Harvard, 1901; began a law practice, 1906, in Providence, R. I.; was a member of the Representative Council of Newport, R. I., 1912; delegate to the National Democratic Conventions of 1912 and 1916. He was elected to Congress from the 2d R. I. District for the term 1913-1915, and to the United States Senate for the term 1917-1923.

GERS (zhar), a department in S. W. France, separated by Landes from the Bay of Biscay; area, 2,425 square miles; capital, Auch. There are parallel lines of hills in the S., separated by fan-shaped valleys which expand as they extend toward the plains in the N. The Gers and other principal rivers are tributaries of the Garonne and Adour. One-half of the surface is devoted to agriculture, and nearly a sixth to vineyards. Wine is produced in considerable quantity; a great part of it being converted into Armagnac brandy. Pop. about 222,000.

GERVINUS, GEORG GOTTFRIED (ger-vē'nös), a German historian; born in Darmstadt, Hesse, May 20, 1805. He studied at Heidelberg; was for some time a teacher. He published his "History of the Poetic National Literature of the Germans," 1835-1842. In 1835 he was appointed extraordinary professor at Heidelberg, and the following year ordinary Professor of History and Literature at Göttingen; but in 1837, being one of the seven professors who protested against King Ernst August's breach of the constitution, he was banished from Hanover. After another visit to Italy he returned to Heidelberg, where in 1844 he was appointed an honorary professor. He now became an active liberal in politics, edited the "Deutsche Zeitung" and was returned to the federal diet by the Hanse towns. In 1848, he gave up politics and resumed his old studies. In 1849 he published the first part of the great work on Shakespeare, in 1853 his "History of German Poetry," and in 1855 the first volume of his "History of the Nineteenth Century." Among his last writings was a critical essay on Händel and Shakespeare. He died in Heidelberg, Baden, March 18, 1871.

GESTA ROMANORUM (jes'tä rō-ma-nō'-rum). "Deeds of the Romans," title of a collection of short tales, legends, etc., in Latin, very popular in the Middle Ages. The book was probably written about the close of the 13th century by a certain monk Elinandus, an Englishman or a German. The separate tales making up the Gesta are of very various contents, and belong to different times and countries. Moral reflections and allegorical interpretations were added to them, it is said, by a Petrus Bercorius or Pierre Bercaire of Poitou, a Benedictine prior. After the Reformation the book fell into oblivion.

GESSLER, ALBRECHT, or **HERMAN** (ges'ler), called also GESSLER VON BRUNECK (in Swiss legendry), was in 1300 appointed joint-governor along with Berenger von Landenberg, of the Waldstädten or forest cantons (Schwytz, Unterwalden, and Uri), by Albrecht I. of Austria. According to the traditions connected with WILLIAM TELL (*q. v.*), his oppressive edicts and wanton cruelty so enraged the inhabitants that a conspiracy was formed against him, and he was shot by Tell in a narrow pass near Küssnacht in 1307.

GESTATION, in physiology, the act of carrying young in the uterus from the time of conception to that of parturition. The average time of a woman's pregnancy is 9 solar months, or about 280 days, though it may be as few as 7 or as many as 10. The period of gestation is shorter in carnivorous than in herbivorous animals. The young of the former are also less developed at birth, their eyes not opening for several days thereafter. Herbivorous animals: The elephant has 20 or 21 months' gestation; the giraffe, 14 months; dromedary, 12 months; buffalo, 12 months; ass, 12 months; mare, upwards of 11 months; rhinoceros, 9 months; cow, 9 months; many of the larger deer, over 8 months; sheep and goat, 5 months; pig, 4 months. Rodents: Beaver, 4 months; dormouse, 31 days; rabbit, 30 to 31 days; squirrel and rat, 28 days; guinea-pig, 21 days or

less. Carnivorous: Bear, 6 months; lion, 108 days; puma, 79 days; fox, wolf, and dog, 62-63 days; cat, 55 or 56 days. Pouched animals: Kangaroo, 39 days; opossum, 26 days. Cetaceous animals: Greenland whale, about 10 months. The most common duration for the varieties of monkeys is 7 months. Oviparous animals: The goose sits 30 days; swan, 42 days; hens, 21 days; ducks, 30 days; pea-hens and turkeys, 28 days; canaries, 14 days; pigeons, 21 days; parrots, 40 days. The periods are subject to considerable variation, especially in domestic animals, and various conditions modify the period, of which the above are only the averages.

GETA (jē'tä), **SEPTIMUS**, second son of the Emperor Severus; born A. D. 189, and was brother of the infamous Caracalla, with whom he was associated in the empire on the death of his father. Caracalla, who envied his virtues and was jealous of his popularity, after having endeavored to effect his death by poison, murdered him, and wounded their mother, who was attempting to save him, A. D. 211.

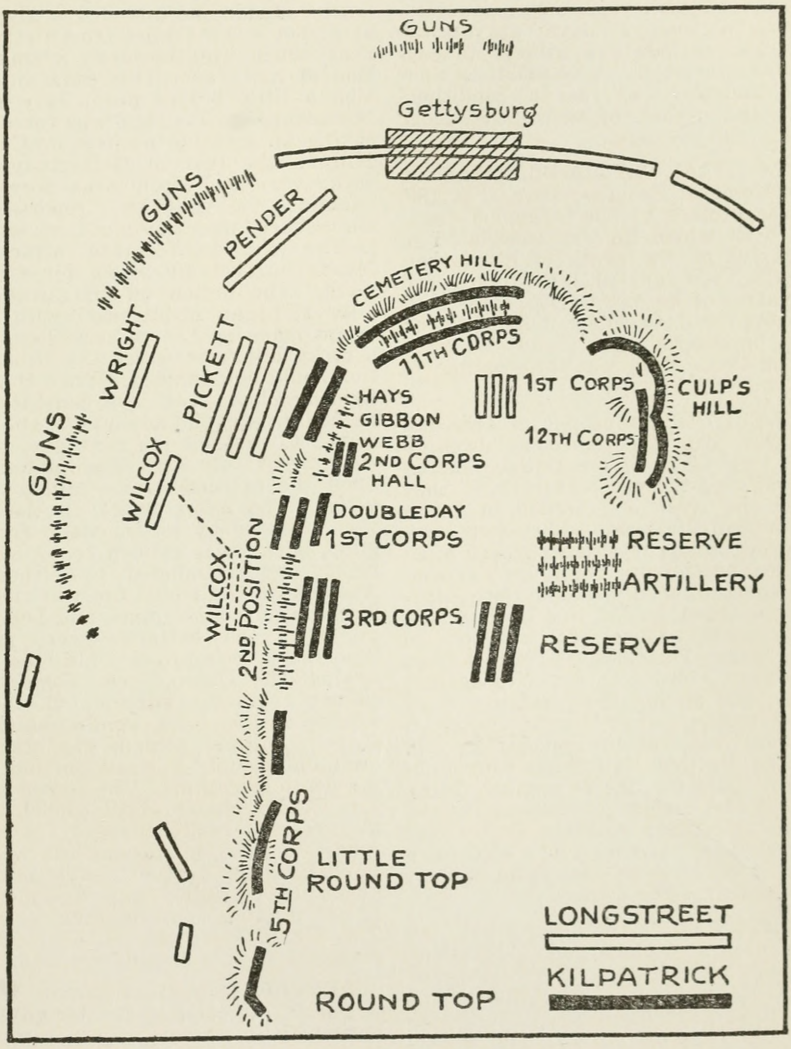
GETÆ (jē'tē), a people of Thracian extraction, first mentioned as dwelling on the right bank of the Danube, but in the middle of the 4th century B. C. they crossed the river and settled in Transylvania and Wallachia. They were conquered by Darius Hystaspes in 515 B. C., and then accompanied him in his campaign against the Scythians. Both Alexander the Great, in 335, and Lysimachus, in 292, made unsuccessful attempts to subdue them. The Getæ, as distinct from the Dacians, sided with Octavius against Antony, and during the greater part of the 1st century after Christ continued to harass the Roman legions. In 106 A. D. the Dacians and Getæ were subdued by Trajan, their country being added to the empire. Subsequently the Getæ became fused with the Goths, who invaded their lands, and afterward carried many of them with them in their W. migrations. See JATS.

GETHSEMANE (geth-sem'a-nē), an olive garden or orchard near Jerusalem, memorable as the scene of the last sufferings of our Lord. The traditionary site of this garden places it on the E. side of the city and a very little beyond the Kedron, near the base of Mt. Olivet.

GETTYSBURG, BATTLE OF, a battle fought July 1-3, 1863, between the Union army under General Meade, and the Confederates under General Lee. During May the armies lay fronting each other upon the Rappahannock. Early in June Lee began his movement for the invasion of Pennsylvania, crossing the Potomac on the 24th and 25th, and reaching Chambersburg, Pa., on the 27th. General Hooker, then in command of the Army of the Potomac, moved in the same general direction, but on the 28th was relieved, and the command given to Meade. In order to prevent his communications from being severed, Lee turned back toward Gettysburg to give battle. Meade had intended to give battle at a spot several miles from Gettysburg, near which was, however, a small portion of his army. This came into collision a little before noon, July 1, with the advance of Lee, and was forced back, taking up a strong position on Cemetery Hill, in the rear of Gettysburg. Hancock, who had been sent forward to examine the position, reported that Gettysburg was the place at which to receive the Confederate attack, and Meade hurried his whole force to that point. The action on the second day, July 2, began about noon with an attempt made by Lee to seize Round Top, a rocky hill from which the Union position could be enfiladed. When this day's fighting closed Lee was convinced that he had greatly the advantage, and he resolved to press it the next day. On the morning of July 3 an attempt was made upon the extreme Union right, but repelled. The main attack on the center was preluded by a cannonade from 150 guns, which was replied to by 80, little injury being inflicted by either side. About noon the Union fire was slackened in order to cool the guns, and Lee, thinking that the batteries were silenced launched a column of 15,000 or 18,000 against the Union lines. Some of this column actually surmounted the low works, and a brief hand-to-hand fight ensued. But the column was practically annihilated, only a small portion escaping death or capture. The forces on each side were probably about 80,000, though all were not really engaged. No official report of the Confederate loss was ever published; the best estimates put it at about 18,000 killed and wounded, and 13,600 missing, most of them prisoners. The Union loss was 23,187, 16,543 of whom were killed and wounded.

GEYSER (gī'zer) (Icelandic *geysa* = to gush), in geology, an intermittent hot spring, the most notable specimens being those in the Yellowstone region of the Rocky Mountains and those of the S. W. division of Iceland, about 30 miles from Mount Hecla. Nearly 100 of the latter are said to break out within a circle of 2 miles. Few of them play longer than five or six minutes at a time, though sometimes they go on for half an hour. The largest is called the Great Geyser.

It has a pipe 78 feet in vertical depth, and from 8 to 10 feet in diameter, but gradually widening as it rises into the basin. The latter is 56 feet long by 46 feet broad, and is lined with an incrustation of silica deposited from the hot water, the process being aided by the alkali soda, which, with minute quantities of various salts, exists in the water. When the geyser is about to act, subterranean noises are heard like the distant firing of cannon, and the earth is slightly shaken; then a column of the liquid element is thrown up to the height of 100 or 200 feet. Steam after a time makes its way out of the rent, and the fountain ceases to play. The second in size is the Strokkur. If stones or turf be thrown down its pipe, an eruption will follow within a few minutes, and eject them with great force. Geyser action is produced by the heating of the lower part of the geyser tube. There are also some remarkable geysers in New Zealand in the Northern Island.



BATTLE OF GETTYSBURG

GHATS, or **GHAUTS** (gâts), **EASTERN** and **WESTERN**, two converging ranges of mountains, which run parallel with the E. and W. coasts of southern

India, and meet at Cape Comorin, inclosing the Deccan. The Ghats commence in the vicinity of Balasor, a little N. of the Mahanadi, and run through Madras, with an average height of 1,500 feet, for the most part at a distance of from 50 to 150 miles from the coast. They are nowhere a watershed on any considerable scale, being penetrated and crossed by nearly all the drainage of the interior. The Western Ghats stretch from the valley of the Tapti, in about the same latitude as Balasor, to their junction with the kindred ridge, and on to Cape Comorin itself. Though they are generally far more continuous and distinct than the Eastern Ghats, yet they are sharply divided by the gap of Palghát—the N. section measuring 800 miles in length, and the S. 200. Their general elevation varies from about 3,000 feet to upward of 7,000; the peak of Dodabetta, in the Nilgiri hills, is 8,760 feet above sea-level.

The name Ghats is also applied to the flights of steps, whether intended as landing places or as bathing stairs, which line the river banks in towns and places of pilgrimage in northern and central India. Most great rivers, and especially the Ganges, possess many ghâts; but they are also built on the margins of lakes, as at Pushkar and Sagar, or even of tanks. The uniformity of the long lines of steps is often broken by shrines or temples, built either close to the water's edge or at the top; and on these steps are concentrated the pastimes of the idler, the duties of the devout, and much of the necessary intercourse of business. The ghats of Benares, Harwar, Panharpur, and of Maheswar, on the Nerbudda, are noteworthy either for their number or beauty; while Cawnpur, Sadullapur, the ruined city of Gaur, and other places possess noted "burning ghats" for purposes of cremation.

GHAZIPUR (gä-zē-pör'), a city, capital of the district of Ghazipur, India, on the left bank of the Ganges, 44 miles N. E. of Benares. The city, which stretches along the Ganges for about 2 miles, contains the ruins of the palace of Forty Pillars, and a marble statue by Flaxman to Lord Cornwallis, who died here in 1805. Ghazipur is the headquarters of the Government Opium Department for the Northwest provinces, all the opium from these provinces being manufactured here, and there is some trade in sugar, tobacco, rosewater, and cloth. Pop. about 23,000.

GHAZNI (gäz'nē or guz'nē), a town of Afghanistan, below a spur of a range of hills, at an elevation of 7,729 feet, 84 miles S. W. of Kabul, on the road to Kandahar and at the head of the Gomal route to India. It is a place of considerable commercial importance. The climate is cold, snow often lying for three months in the year. Nevertheless, wheat, barley, and madder are grown in the vicinity. From the 10th to the 12th century Ghazni was the capital of the empire of the Ghaznevids (see below); it then fell into the hands of the Sultan of Ghûr; and afterward captured by the Mongols. It remained subject to the Mongol rulers of Delhi and Agra till 1738, when it was taken by Nadir Shah of Persia, and at his death was incorporated in the kingdom of Afghanistan. During the 19th century it figured in the British wars against the Afghans, having been stormed by Lord Keane in 1839, and again in 1842 by the Afghans, but retaken the same year by General Nutt. In the neighborhood of Ghazni there are several ruins and monuments of its former greatness, such as the tomb of Mahmud, Mahmud's dam in the Ghazni river, and many Mohammedan shrines. The celebrated gates of Somnath were kept at Ghazni from 1024 to 1842.

Ghaznevid Dynasty.—About the middle of the 10th century a lieutenant of the Samanid ruler of Bokhara seized on Ghazni, and, dying in 977, left it to his son-in-law, Sebuktagin, who during a reign of 20 years extended his sway over all modern Afghanistan and the Punjab. But it was under his son Mahmud (997-1030) that the Ghaznevids reached their highest point of splendor and renown. This prince repeatedly invaded India, and carried his conquering arms as far as Kurdistan and the Caspian on the W. and to Samarkand on the N. He was the first monarch in Asia to assume the title of sultan. His descendants had a keen struggle to maintain themselves against the Seljuks, who had seized on Khorasan, Balkh, Kharezm, and Irak during the reign of Mahmud's son Masaud (1030-1042), and against their jealous rivals the princes of GHÛR (*q. v.*). Bahram Shah, ruler of Ghazni from 1118 to 1152, was at length driven from his capital by the latter, and retired to the Punjab. There his grandson, Khosrau Malek, the last of the dynasty, made Lahore his capital. This town was, however, taken by the Prince of Ghûr in 1186, and with this the Ghaznevid dynasty came to an end.

GHEE, or **GHI** (gē), a kind of butter in use among the Hindus; made from the milk of the buffalo or the cow. The milk is boiled for an hour or so, and cooled, after which a little curdled milk is added. Next morning the curdled



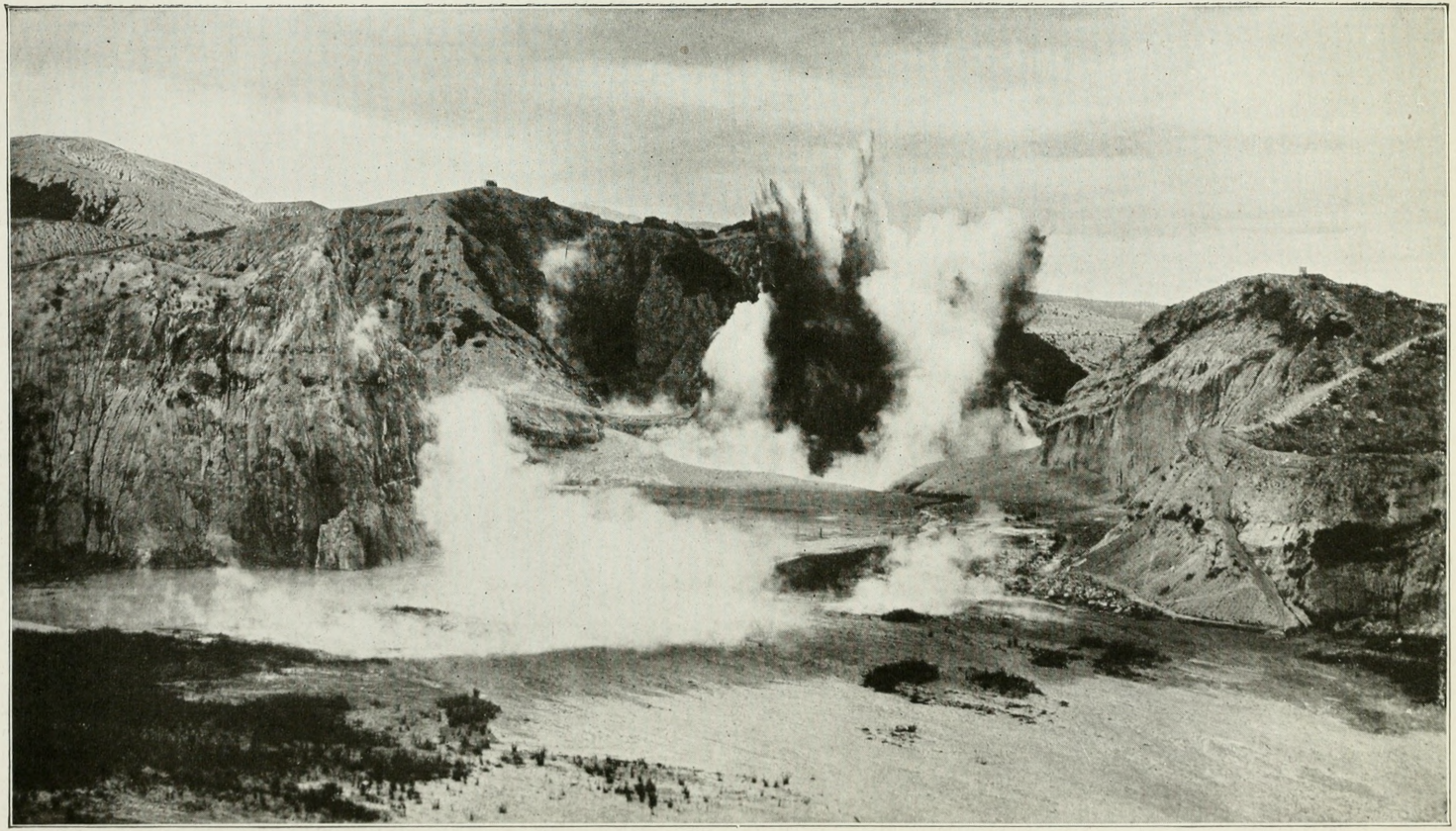
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A GEYSER IN ERUPTION



© E. M. Newman

FORMATION AT MAMMOTH HOT SPRINGS, YELLOWSTONE NATIONAL PARK



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A GROUP OF THE FAMOUS HOT SPRINGS IN NORTH ISLAND, NEW ZEALAND



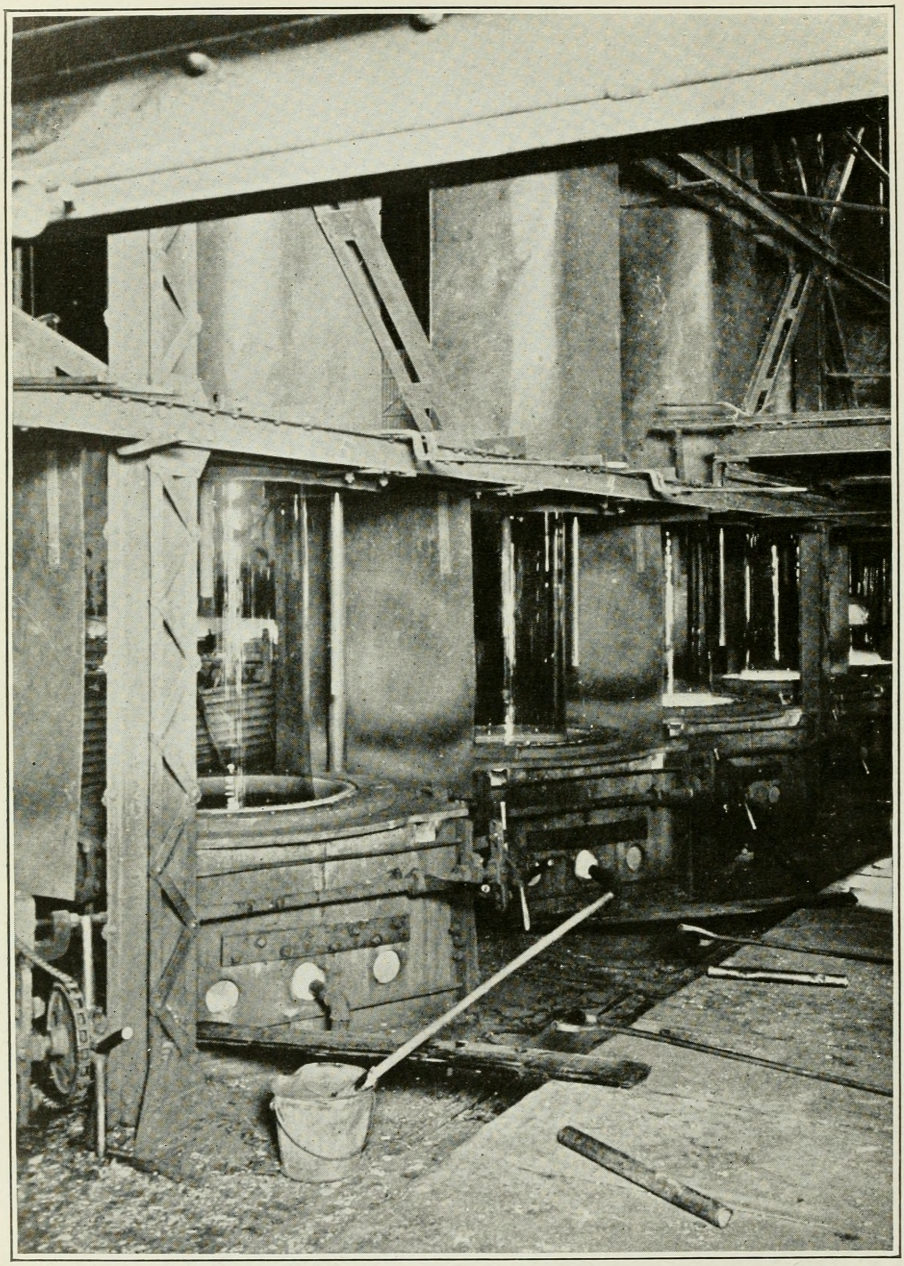
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CONE OF CASTLE GEYSER, YELLOWSTONE NATIONAL PARK



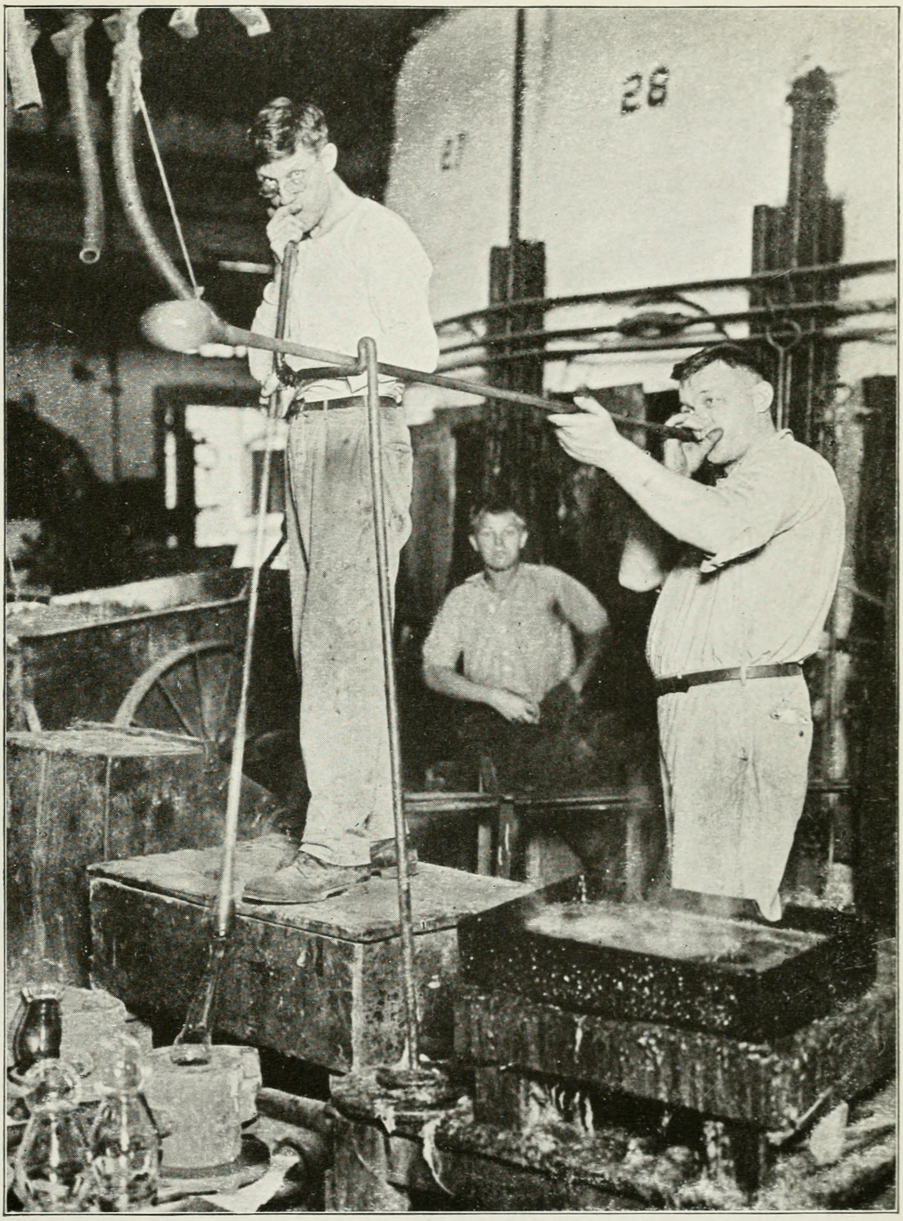
Courtesy of the National Park Service

LOOKING INTO THE BATHTUB GEYSER, YELLOWSTONE NATIONAL PARK



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INTERIOR OF WINDOW-GLASS AND PLATE-GLASS FACTORY



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GLASS BLOWING

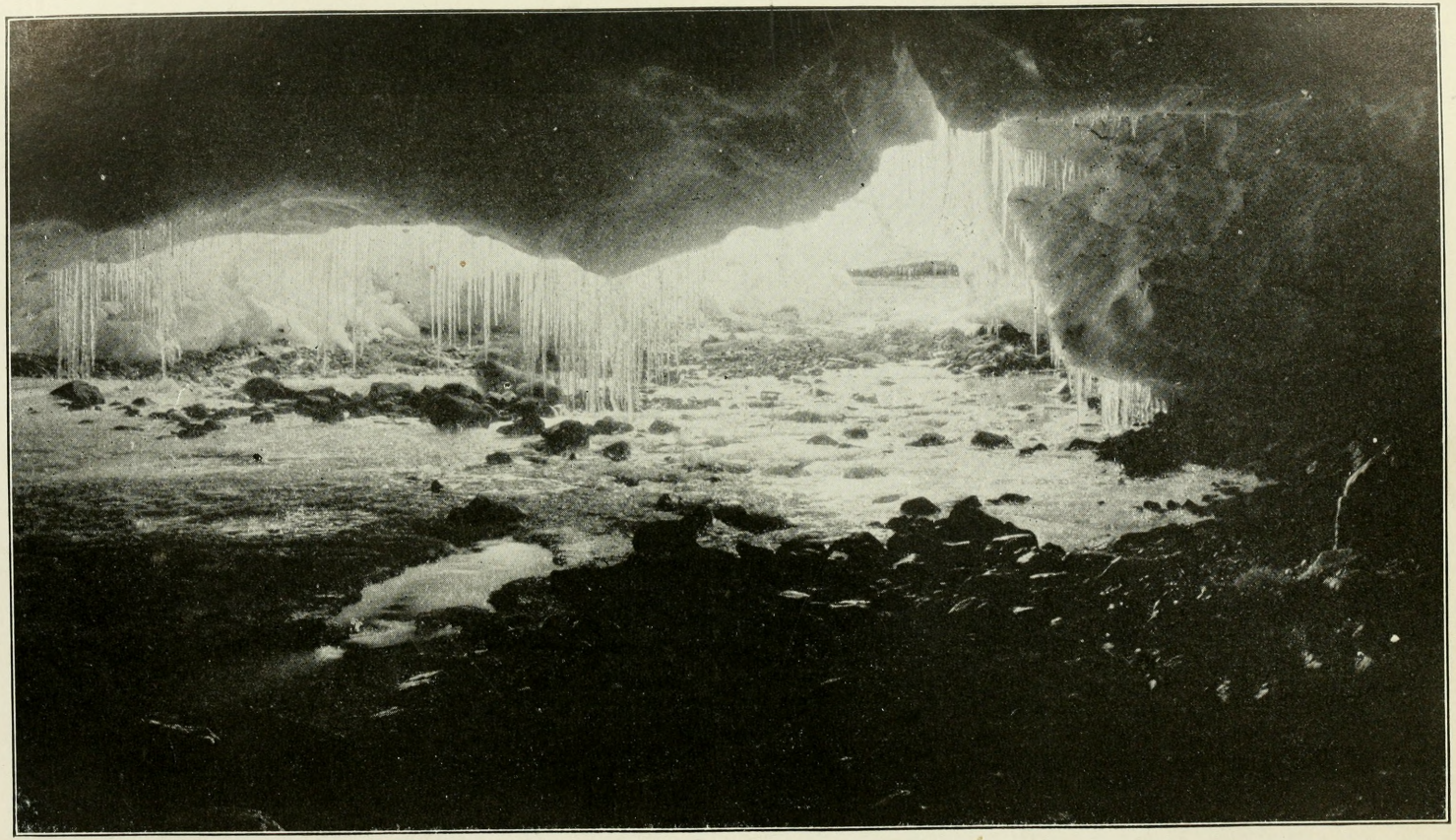


Photo from Collier's Weekly

GREENLAND. A GREAT ICE CAVERN AT NEW DENMARK HAVEN

mass is churned for half an hour; some hot water is then added, and the churning continued for another half hour, when the butter forms. When, after a few days, it becomes rancid, it is boiled till all the water is expelled, and a little more curdled milk added, with some salt or betel leaves, after which it is put into pots. It is a favorite article of consumption among rich Hindus.

GHENT (French, Gand; Flemish, Gend or Gent), a town in Belgium, capital of the province of East Flanders, at the confluence of the Lys with the Scheldt. It is upward of 6 miles in circumference, and is divided by canals into a number of islands connected with each other by bridges. Except in some of the older parts, it is well built, and has a number of fine promenades and many notable buildings. Among the latter are the cathedral of St. Bavon, dating from the 13th century; the church of St. Nicholas, the oldest in Ghent; the church of St. Michael, with a celebrated Crucifixion by Van Dyke; the university, a handsome modern structure, with a library of about 100,000 volumes and 700 manuscripts; the City Hall, the belfry, a lofty square tower surmounted by a gilded dragon, and containing chimes of 44 bells; and Les Béguinages, extensive nunneries founded in the 13th century, the principal occupation of whose members is lace-making. Ghent has long been celebrated as a manufacturing town, especially for its cotton and linen goods and lace. Other industries of importance are sugar-refining, hosiery, thread, ribbons, instruments in steel, carriages, paper, hats, delftware, and tobacco. There are also machine works, engine factories, roperies, tanneries, breweries, and distilleries. The trade is very important. Ghent was mentioned as a town in the 7th century. In the 9th century Baldwin, the first Count of Flanders, built a fortress here against the Normans. Under the counts of Flanders Ghent continued to increase. Two great revolts took place under the leadership of the Van Arteveldes (1338 and 1369) against Burgundy, and again in the 16th century against Charles V., and the citizens of Ghent, besides losing their privileges, had to pay for the erection of a citadel intended to keep them in bondage. In 1794 the Netherlands fell under the power of France, and Ghent became the capital of the department of Escaut (Scheldt). In 1814 it became, along with Flanders, part of the Netherlands, till the separation of Belgium and Holland. In 1914 the Germans occupied Ghent. Pop. (1919) 165,655. See WORLD WAR.

GHENT, TREATY OF. A treaty between the United States and Great Britain, concluded at Ghent, Dec. 24, 1814, which terminated the War of 1812.

GHENT, UNIVERSITY OF, a Flemish university of Belgium, supported by and under the control of the State. It was founded in 1816 by King William I of Holland. As a result of the revolution of 1830 the activities of the University were temporarily curtailed, two of its four faculties being suppressed. Its full curriculum, however, was restored in 1835. From time to time special schools have been absorbed and it has now four faculties; philosophy, science, law, and medicine. The library of the University is especially noteworthy, containing some 400,000 volumes and numerous valuable manuscripts. It is especially strong on the history and literature of the Low Countries. In 1918-1919 there were 1,006 students.

GHENT, WILLIAM JAMES, an American writer and economist, born in Frankfort, Ind., in 1866. He was educated in the public schools and for a time worked as a compositor and proofreader in various cities. He became a regular contributor to magazines and in 1897-1899 was editor of the "American Fabian." He was one of the founders of the Social Reform Club of New York, and was secretary of the Rand School of Social Science from 1906 to 1909. From the latter year to 1911 he was president of this school. He was National executive committeeman of the American Alliance for Labor and Democracy for 1917. He wrote "Our Benevolent Feudalism" (1902); "Mass and Class" (1904); and "Socialism and Success" (1910).

GHERARDESCA (gā-rär-des'kä), a family of Tuscan origin which plays an important part in the history of the Italian republics of the Middle Ages. Historically the most prominent member of the family is Ugolino, whose death, and that of his two sons and grandsons, by starvation in the "Tower of Hunger," is described in one of the celebrated passages of Dante's "Divine Comedy." Ugolino had made himself master of Pisa, and had behaved in the most cruel and arbitrary manner for four years, when, in 1288, he was overthrown by a conspiracy.

GHERARDI, BANCROFT (-rär'dê), an American naval officer; born in Jackson, La., Nov. 10, 1832; he entered the navy as midshipman from Massachusetts in 1846, and was at the Naval Academy in 1852. He was lieutenant on the "Lan-

caster," of the Pacific squadron, at the commencement of the Civil War, and in 1862 was made lieutenant-commander. During the war he commanded the "Chocorua" and "Port Royal," being on the latter vessel in the battle of Mobile Bay, in which he was distinguished for bravery and gallantry. He became commander in 1866; captain in 1874; commodore in 1884; and rear-admiral in 1887; he was commandant of the Brooklyn navy yard in 1886; commanded the North Atlantic Squadron; and directed the Columbian naval review in New York harbor in 1893. He retired in 1894. He died in 1903.

GHERIAH (ger'i-ä), a town of British India. It was the principal port of Augria, a famous piratical prince, whose fort was taken and his whole fleet destroyed by the English and Mahrattas in 1756.

GHETTO, the Jewish quarter in Italian cities, to which they were formerly confined. The ghetto of Rome, instituted in 1556 by Pope Paul IV., was removed in 1885, its demolition having been rendered necessary by the new Tiber embankment. The term is also employed to indicate the Jews' quarters in any city.

GHI. See GHEE.

GHIBELLINES (gib'e-linz), a political party of the 12th to the 15th centuries. On the death of Lothaire II., Emperor of Germany, Dec. 4, 1137, Conrad, Duke of Franconia and Lord of Weiblingen (which by corruption became Ghibelline), was elected his successor. His right to the imperial throne was, however, disputed by Henry the Proud, Duke of Saxony and Bavaria, who was in consequence declared an outlaw and shortly afterward died. His adherents transferred their allegiance to his son Henry the Lion, at that time a boy of 10 years old, and the whole empire was divided into the partisans of Conrad, who assumed the name of Ghibellines, and those of Henry, or the Guelphs. These titles were first used at the battle of Weinsberg in 1140. The strife between the two parties subsided in Germany, but continued in Italy, resulting in war in 1159. The supporters of the Popes were termed Guelphs and those of the emperors Ghibellines. Charles of Anjou expelled the Ghibellines from Italy in 1268; but the contest between the two factions continued until the French invasion in 1495 united them against a common enemy.

GHIBERTI, LORENZO (gē-ber'tē), an Italian sculptor; born in Pelago, Italy, in 1378. He early learned from his stepfather Bartoluccio, an expert goldsmith, the arts of drawing and modeling, and that of casting metals. He was engaged in painting frescoes at Rimini, in the palace of Pandolfo Malatesta, when the priori of the society of merchants at Florence invited artists to propose models for one of the bronze doors of the baptistery of San Giovanni. The judges selected the works of Brunellesco and Ghiberti as the best, but the former voluntarily withdrew his claims, giving the preference to Ghiberti. After 21 years' labor Ghiberti completed the door, and, at the request of the priori, executed a second, after almost as long a period. Michael Angelo said of these that they were worthy of adorning the entrance to paradise. During these 40 years Ghiberti also completed other works, bas-reliefs, statues, and some excellent paintings on glass, most of which may be seen in the cathedral and the Church of Or San Michele at Florence. He died in Florence, Italy, in 1455.

GHIRLANDAJO (gēr-län-dä'yō), **IL.** DOMENICO CURRADI, nick-named Il Ghirlandajo ("the garland-maker"), an Italian painter; born in Florence, Italy, in 1449. As a youth he was apprenticed to a goldsmith, and it was not until his 31st year that he became known as a painter. He painted principally frescoes, and in his native city. The Church of Ognisanti there contains from his hand a "St. Jerome" and a "Last Supper" (1480); the Palazzo Vecchio, the "Apotheosis of St. Zenobius" (1481-1485); the church of St. Trinità, six subjects from the life of St. Francis (1485) and an altar-piece, the "Adoration of the Shepherds"; the choir of St. Maria Novella, a series illustrating the lives of the Virgin and the Baptist (1490). Between 1482 and 1484 he painted for Pope Sixtus IV., in the Sistine Chapel at Rome, the excellent fresco "Christ Calling Peter and Andrew," and about the same time two pictures in the chapel of St. Fina at San Gimignano. Besides these he also executed some easel pictures of great merit, as "Adoration of the Magi" (1488), in the church of the Innocents at Florence; the "Visitation of the Virgin" (1491), in the Louvre; the "Adoration of the Virgin by the Saints," in the Uffizi at Florence; and "Christ in Glory," at Volterra. He also executed mosaics, that of the "Annunciation" in the cathedral of Florence being especially celebrated. He died in Florence, Italy, Jan. 11, 1494.

GHÛR (gör), **or GHORE** (gōr), a mountainous district of western Afghanistan, lying S. E. from Herât and N.

W. from Kandahar; inhabited by Hazaras and Eimaks, and since 1845 has been included in the territory of Herât.

GHÛRI, a dynasty of princes who had the seat of their empire in the country of Ghûr, and ruled over Persia, Afghanistan, northern Hindustan, and Transoxiana. We first read of Ghûr in connection with Mahmud of Ghazni and his son Masaud, the latter of whom subjugated the region in 1020. About a century later Malik Izzuddin made himself ruler of all the Ghûr country. His son, Alauddin Jahansoz (the Burner), fell upon Ghazni, and took it and burned it to the ground. This prince's nephews, Ghiyassuddin and Muizuddin, established their power in Khorasan and Ghazni. The latter, crossing the Indus, then conquered successively the provinces of Multan (1176), Lahore (1186), and Ajmere (1190), and in the course of the next six years, all Hindustan as far S. as Nagpur and E. to the Irawadi. On the death of Muizzuddin the Indian states asserted their independence, the power of the Ghûri being confined to Ghûr, Seistan, and Herât. This last feeble remnant was taken from them by the Shah of Kharezm about 1215. Some 30 years later the Ghûr princes managed to revive something of their former power at Herât, which they retained by sufferance from the Mongols down to 1383, when the city was captured by Timur, and the Ghûr sovereignty came to an end.

GHUZEL-HISSAR, a town of Anatolia in Asia Minor, 55 miles from Smyrna, the site of ancient Tralles.

GIA-DINH. See SAIGON.

GIANTS, people of extraordinary stature. History makes mention of giants, and even of races of giants, but this in general occurs only at an early stage of civilization when the national mind is apt to exaggerate anything unusual. The first mention of giants in the Bible is in Gen. vi: 4, where the Hebrew word used is *nephilim*, a word which occurs in only one other passage, where it is applied to the sons of Anak, who dwelt about Hebron, and who were described by the terrified spies as of such size that compared with them they appeared in their own sight as grasshoppers. A race of giants called the Rephaim is frequently mentioned in the Bible, and in Gen. xiv. and xv. appear as a distinct tribe, of whom Og, King of Bashan, is said to have been the last. Other races of giants are mentioned, such as the Emim, the Zuzim, and the Zamzummim. The tales of old writers regarding gigantic human skeletons have now no importance, it being mostly certain that these bones do not belong to giants, but to animals of the primitive world which, from ignorance of anatomy, were taken for human bones. A gigantic human skeleton, however, the largest ever recorded, was found in 1899, near Miamisburg, O., in a locality which contains many relics of the mound builders. It is of prehistoric age and is fossilized. It must have belonged to a man 8 feet 1½ inches high, and extremely well proportioned. The skull is of an extremely low order and resembles that of the gorilla, the jaws projecting beyond the face.

GIANTS' CAUSEWAY (deriving its name from a legend that it was the commencement of a road to be constructed by giants across the channel to Scotland), a natural pier or mole of columnar basalt, projecting from the N. coast of Antrim, Ireland, into the North Channel, 7 miles N. E. of Portrush. It is part of an overlying mass of basalt from 300 to 500 feet in thickness, which covers almost the whole county of Antrim and the E. part of Londonderry. It is exposed for 300 yards, and exhibits an unequal pavement, formed of the tops of 40,000 vertical closely fitting polygonal columns, which in shape are chiefly hexagonal. The diameter of the pillars varies from 15 to 20 inches. Each pillar is divided into joints of unequal length, the concave hollow at the end of one division fitting exactly into the convex projection of the other. The Giants' Causeway is itself formed of three causeways, the Little, Middle or Honeycomb, and the Grand Causeway. On the Little Causeway may be seen an octagon, pentagon, hexagon, and heptagon all together; on the Middle Causeway is the famous Wishing Chair, with two arms and a back, on the platform where the columns rise to a height of about 10 feet. At the starting point is the Giants' Loom, an imposing row of columns 30 feet high, each intersected by about 30 joints; to the left is the Giants' Well, to the right the Giants' Chair.

GIARRE (jär're), a town of Sicily, in the province of Catania, on the E. slope of Mount Etna. The surrounding district produces excellent wine. Pop. about 18,000.

GIARRETTA (jär-ret'tä), or **SIMETO** (sē-mā'tō), a river of Sicily, which, with its affluents, the Adriano, Trachino, Dettaino, and Chrisas, waters the plain of Catania, and the portion of the island W. of Mount Etna. It rises 20 miles S. E. of Caronia, and after a very tortuous course of 50 miles enters the Mediterranean 6 miles S. of Catania.

GIBBET, a gallows on which the bodies of criminals who had been guilty of particularly atrocious crimes were suspended after execution, incased in an iron frame, near the spot where the crime was committed. This was done for the purpose of striking terror into the evil-minded. The practice, first recognized by law in 1752, was abolished in 1834.

GIBBON, a genus of tailless anthropoid apes, natives of the East Indies. They are nearly allied to the orangs and chimpanzees, but are of more slender form, and their arms so long as almost to reach the ground when they are placed in an erect posture; there are also naked callosities on the buttocks. In this respect they differ from the other anthropoid apes and are allied to some of the catarrhini; in other respects also the gibbons are the lowest among the anthropoid apes, and connect them with the catarrhini. The gibbons are inhabitants of forests, their long arms enabling them to swing themselves from bough to bough. They cannot, however, move with ease or rapidity on the ground. The conformation of the hinder extremities adds to their difficulty in this, while it increases their adaptation to a life among the branches of trees, the soles of the feet being much turned inward. None of the gibbons are of large size. There are some 8 or 10 species. The common gibbon, or lar gibbon, is found in some parts of India, and in more E. regions. The active gibbon, found in Sumatra, is particularly remarkable for the power which it displays of flinging itself from one tree to another.

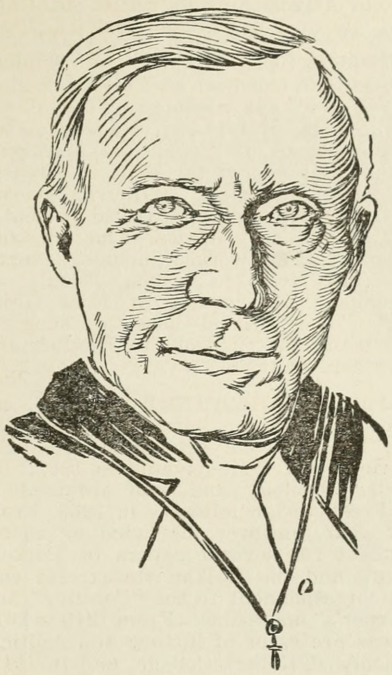
GIBBON, EDWARD, an English historian; born in Putney, April 27, 1737; studied at Westminster School, Magdalen College, Oxford, and Lausanne. On returning to England he prepared himself for authorship. In 1763 he went to Italy; and while sitting amid the ruins of the Capitol at Rome, he conceived the idea of writing the history of the decline and fall of that city. In the meantime he joined M. Deyvurdun, a Swiss scholar, in publishing a journal called "Literary Memoirs of Great Britain," which met with no success. In 1772 he began his celebrated history of the "Decline and Fall of the Roman Empire." Previous to this undertaking Gibbon was chosen member of Parliament for Liskeard; and when hostilities commenced between England and France, in 1778, he was employed to draw up the manifesto on that occasion, after which he was made Commissioner of the Board of Trade, but lost his place on the change of administration in 1783. He then went to reside at Lausanne, where he remained till the French Revolution obliged him to return to England. He died in London, Jan. 16, 1794.

GIBBON, PERCEVAL, an English novelist. He was born at Trelech, Wales, in 1879, and was educated at the Moravian School, Königsfeld, Baden. After leaving school he joined the merchant marine and served on British, French, and American ships. As journalist and war correspondent he traveled in south, central, and east Africa, America, and Europe. His works include: verse, "African Items"; novels, "Souls in Bondage," "Adventures of Miss Gregory," "The Second-Class Passenger," with many contributions to English and American magazines.

GIBBONS, HERBERT ADAMS, an American writer, born at Annapolis, Md., in 1880. He graduated from the University of Pennsylvania in 1902. He studied theology and was ordained to the Presbyterian ministry in 1908. From that year, however, he acted as correspondent for several papers in Turkey, Egypt, and the Balkan states. He was also correspondent to the "Century" and "Harper's" magazines. From 1910 to 1913 he was professor of history and political economy at Robert College, and in 1917-1918 he was American lecturer for French foreign affairs ministry, in France. He was Spencer Trask lecturer at Princeton in 1919. His writings include "The New Map of Europe" (1914); "The Foundation of the Ottoman Empire" (1915); "The New Map of Africa" (1916); "The New Map of Asia" (1919); and "France and Ourselves" (1920).

GIBBONS, JAMES, an American prelate; born in Baltimore, Md., July 23, 1834; was taken to Ireland by his parents early in life. Returning to the United States in 1848 he settled in New Orleans; was educated at St. Charles College, Maryland, and at Mary's Seminary, Baltimore; was ordained to the Roman Catholic priesthood in June, 1861; and appointed as assistant in St. Patrick's Cathedral, Baltimore. Later he became the private secretary of Archbishop Spalding, and chancellor of the diocese. In 1868 he was made vicar-apostolic of North Carolina, with the rank of bishop; and in 1877 became Archbishop of Baltimore. He was elevated to the cardinalate in 1886, being the second Roman Catholic in the United States to receive that promotion. In 1891 Cardinal Gibbons denounced Peter P. Cahensly's plan for racial U. S. church grouping,

which soon made the movement unpopular. His publications include "The Faith of Our Fathers," "Our Christian



CARDINAL GIBBONS

Heritage," and "The Ambassador of Christ." He died March 24, 1921.

GIBBS, OLIVER WOLCOTT, an American chemist; born in New York City, Feb. 21, 1822; was graduated at Columbia College in 1841 and at the New York College of Physicians and Surgeons in 1843; was Professor of Physics and Chemistry in the College of the City of New York in 1849-1863; and Rumford Professor in Harvard University in 1863-1887. He has made many valuable chemical researches and contributed largely to scientific periodicals, principally "The American Journal of Science and Arts," of which he was one of the editors for many years. Dr. Gibbs was the only American honorary member of the German Chemical Society; was one of the original members and a president of the National Academy of Sciences. He died in 1908.

GIBBS, SIR PHILIP, an English author and journalist. He was born in 1875 and was educated privately. After leaving school he became at 21 one of the editors of Cassell and Company; editor of Tillotson's Literary Syndicate, 1901; and acted successively as a literary editor of the Daily Mail, Daily Chronicle, and Tribune, afterward becoming special correspondent and descriptive writer on the Daily Chronicle. His articles from the field during the great war attracted attention. His works include: novels—"The Romance of Empire"; "Men and Women of the French Revolution"; "Now It Can Be Told" (1920); with some essays, plays, and numerous articles on the World War. He lectured in the United States in 1920 and 1921.

GIBEON, a city of ancient Palestine on a hill among the mountains of Benjamin, 5 miles N. W. of Jerusalem. At the conquest of Canaan by the Israelites under Joshua, it was inhabited by Hivites. By a clever stratagem the Gibeonites insured the alliance and protection of the invaders, but, their deceit being afterward found out, they were reduced to a condition of servitude, being made "hewers of wood and drawers of water unto all the congregation." When the five kings of the Amorites besieged Gibeon for having entered into a traitorous compact with the common enemy of all the Canaanites, Joshua hastened to its help, and overthrew the besiegers with great slaughter. It was there that Joshua, in the words quoted from the book of Jashar (Josh. x: 12), commanded the sun to stand still upon Gibeon, and the moon in the valley of Ajalon.

GIBRALTAR, a town and strongly fortified rocky peninsula near the S. extremity of Spain, belonging to Great Britain. It is connected with the mainland by a low sandy isthmus, 1½ miles long and ¾ mile broad, known as the "neutral ground," with Gibraltar Bay on the W., the open sea on the E. and S. The highest point of the rock is about 1,400 feet above sea-level; its N. face is almost perpendicular, while its E. side exhibits tremendous precipices. On its S. side it is almost inaccessible, making approach from seaward impossible; the W. side, again, although very rugged and precipitous, slopes toward the sea; and here the rock is secured by extensive and powerful batteries, rendering it apparently impregnable. Vast sums of money and an immense amount of labor have been spent in fortifying this celebrated stronghold.

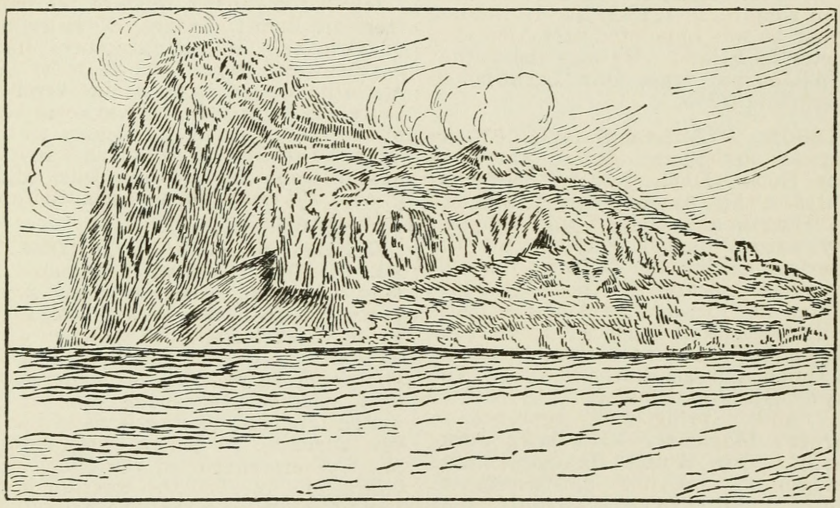
The town of Gibraltar is situated on the W. side of the peninsula, terminating in Europa Point, and thus fronts the bay. It consists chiefly of one spacious street about half a mile in length, lined with shops, and paved and lighted. The principal buildings are the governor's and lieutenant-governor's houses, the admiralty, naval hospital, etc. Its water

supply is derived from the rainfall. Gibraltar is a free port, and has a considerable shipping trade. The chief export is wine. The administration is vested in the governor, who is also commander-in-chief of the troops. Pop. (1919), 16,096. It was ultimately taken by the Spaniards from the Moors in 1462, fortified in the European style, and so much strengthened that the engineers of the 17th century considered it impregnable. It was taken, however, after a vigorous bombardment in 1704 by a combined English and Dutch force under Sir George Rooke and Prince George of Darmstadt, and was secured to Great Britain by the peace of Utrecht in 1713. Since then it has remained in British hands, notwithstanding some desperate efforts on the part of Spain and France to retake it. In 1779, Great Britain being then engaged in a war with its revolted colonies and with France, a last grand effort was made by Spain to recover Gibraltar. The siege lasted for nearly four years. It was heroically and successfully defended, however, by General Elliott (afterward Lord Heathfield) and the garrison. Since that time, in the various British and Spanish and also French wars, Gibraltar has only been blockaded on the land side.

GIBRALTAR, BAY OF, an inlet of the sea formed by the headland of Cabrita and Europa Point, 4 miles distant from each other, and is spacious and well adapted for shipping, being protected from all the more dangerous winds; the extreme depth within the bay is 110 fathoms. To increase the security of the harbor, two moles have been constructed, which respectively extend 1,100 and 700 feet into the bay. The Spanish town and port of Algeciras lie on its W. side.

GIBRALTAR MONKEY, an originally African monkey, a colony of which is wild on the rocks of Gibraltar.

GIBRALTAR, STRAITS OF, the straits connecting the Mediterranean Sea with the Atlantic Ocean extending from Cape Spartel to Cape Ceuta, on the N. W. coast of Africa, and from Cape Trafalgar to Europa Point on the S. W. seaboard of Spain. They narrow toward the E., their width between Europa Point and Cape Ceuta being only 15 miles, while at the W. extremity it is 24 miles. Length, E. to W., about 36 miles.



ROCK OF GIBRALTAR

GIBSON, CHARLES DANA, an American artist and illustrator, born at Roxbury, Mass., in 1867. He was educated in private schools and studied art at the Art Students' League at New York. He early attained success with his black and white drawings in magazines; and his drawings of social subjects done in a gently satiric vein gained for him a wide reputation. He became one of the most widely known artists, not only in the United States but in England. Much of his work was done for the humorous periodical "Life," which he purchased in 1920. His published books of pictures include "Sketches in London"; "People of Dickens"; "Drawings"; "The Education of Mr. Pipp"; "A Widow and Her Friends"; and "The Social Ladder". He was a member of the National Institute of Arts and Letters.

GIBSON, HUGH, an American diplomat, born at Los Angeles, Cal., in 1883. He was educated in France, and in 1908 was appointed secretary of legation at Honduras. In 1909-1910 he was 2d secretary of the American Embassy in London, and in 1910-1911 he was private secretary to the Assistant Secretary of State, in Washington. He served in Legations in Havana and Santo Domingo and in 1914 was appointed secretary of Legation, in Brussels, where he remained until 1916, when he was assigned to the Embassy in London. In the following year he was on duty at the Department of State in Washington. He was appointed in 1918 1st secretary of the American Embassy in Paris. He was a member of the Inter-Allied Mission to the countries of the former Austro-Hungarian Empire, in 1918-1919. In the latter year he was appointed first American Minister to Poland. He was the author of "A Journal from Our Legation in Belgium" (1917).

GIBSON, WILLIAM HAMILTON, an American artist and author; born in Sandy Hook, Conn., Oct. 5, 1850; contributed to the "American Agriculturist" and "Hearth and Home," and supplied many natural-history subjects for the "American Cyclopædia." Many of his illustrations appeared in the "Art Journal" and in "Picturesque America"; and his illustrations of books were numerous and popular. He was a member of the Art Union and the Authors' Club. The essays, "Birds of Plumage," "A Winter Idyl," and "Springtime," appeared in "Harper's Magazine." His later works included "Our Edible Toadstools and Mushrooms." He died in Washington, Conn., July 16, 1896.

GIDDINGS, FRANKLIN HENRY, an American educator; born in Sherman, Conn., March 23, 1855; was graduated at Union College in 1877; accepted the chair of sociology in Columbia University in 1894. In 1896 he was appointed to the chair of sociology and history of civilization, Columbia University. He is the author of "The Principles of Sociology"; "The Theory of Socialization"; "The Elements of Sociology"; "Democracy and Empire"; "Inductive Sociology" (1901); "Pagan Poems" (1914); "The Western Hemisphere in the World of To-morrow" (1915).

GIDDINGS, JOSHUA REED, an American statesman; born in Athens, Pa., Oct. 6, 1795; admitted to the Ohio bar in 1820; elected a member of its Legislature in 1826, and of Congress in 1838, where he was prominent as an opponent of slavery. In 1861 he was appointed consul-general to British North America. Among his works are: "The Exiles of Florida" (1858); "History of the Rebellion" (1864). He died in Montreal, May 27, 1864.

GIDEON, a judge of Israel. He was the youngest son of Joash, of the house of Abiezer, and lived with his father at Ophrah, in Manasseh. During his youth Israel was sunk in idolatry and sloth, and was oppressed by the plundering incursions of the Amalekites and Midianites. Confident in the assurance of supernatural direction, he mustered the people, reduced the unwieldy host to a handful of resolute men, fell suddenly upon the enemy in the neighborhood of Mount Gilboa, and routed them with great slaughter.

GIÈN (zhyan), a town of the department of Loiret, France, 37 miles S. E. of Orleans. Its manufactures include earthenware, serge and leather. Gièn has a handsome stone bridge across the Loire. Here, in 1410, a treaty was signed by the young Duke d'Orleans, with the dukes of Berry, Bourbon and Brittany, against John the Fearless, Duke of Burgundy, to avenge the assassination of his father, Louis I.

GIERS, NICHOLAS CARLOVITCH DE (gērz), a Russian statesman; born May 21, 1820. After holding various posts, in 1875, he became adjunct to Prince Gortchakoff, the minister of foreign affairs, whom he succeeded in 1882. His policy in general was understood to have peaceful tendencies, and in particular opposed to Panslavistic ideas of development. In central Asia, however, M. de Giers continued the policy of advance, and in 1885 the Russian occupation of positions within the Afghan frontier nearly brought about a war with Great Britain. He died in St. Petersburg, Jan. 26, 1895.

GIESSEN (gēs'sen), a town of Hesse-Darmstadt, Germany, at the confluence of the Wieseck and the Lahn, 40 miles N. of Frankfort-on-the-Main. It is the seat of a university, founded in 1607, which possesses well-appointed laboratories, collections, and museums, and a good library, with 72 professors, and 672 students in 1899. Pop. about 31,000.

GIFFEN, SIR ROBERT, an English economist; born in Strathaven, Scotland, in 1837; went to London in 1862, where he was sub-editor of the "Globe" till 1866. He was acting editor of the "Economist" under Walter Bagehot 1868-1876; then founded the "Statist" and became chief of the Statistical Department in the board of trade and assistant secretary in 1882. He was John Morley's assistant

on the "Fortnightly Review" in 1873-1876; and is the author of a number of reports, papers, and essays, which have given him a high rank. His works include "American Railways as Investments" (1873); "Stock Exchange Securities" (1877); "Essays on Finance" (1879); "The Progress of the Working Classes" (1884). He died April 12, 1910.

GIFFORD, ROBERT SWAIN, an American artist; born in Naushon Island, Mass., Dec. 23, 1840; received a common school education; studied with Albert Van Beest in Rotterdam, Holland; traveled through California and Oregon in 1869, and in Europe and North America in 1870-1871. His principal works include "The Rock of Gibraltar"; "A Lazy Day in Egypt"; etc. He died in 1905.

GIJON (hē-hōn'), a city and seaport of Spain, on the Bay of Biscay, 20 miles N. E. of Oviedo. It manufactures tobacco, glass, and earthenware; exports butter, cheese, fruits, hazelnuts and copper ore; and imports grain, flour, sugar, oil, iron, machinery, spirits, chemicals, and woven goods. Here Jovellanos founded the Collegiate Asturian Institute. Pop. about 55,000.

GILA, RIO, a river of North America, an affluent of the Colorado of the West, origin in New Mexico; length, 450 miles. Its upper course is through mountains, with many deep and precipitous cañons; further S. it flows through an open and comparatively level country, the valley being productive when irrigated. About 200 miles from the Colorado is the reservation of the Maricopa and Pima Indians. Ancient ruins are numerous on the banks of the Gila.



GILA MONSTER

GILA MONSTER, a poisonous lizard also called Sonoran heloderm. It is one of the largest lizards of North America, and is found in the sandy deserts of New Mexico, Arizona, and Texas. Its scales are brilliant orange and jet black. Its bite is rapidly fatal to small mammals and birds, and very injurious, though seldom fatal, to man. The heloderms are the only lizards ascertained to be venomous.

GILBERT, CASS, an American architect, born in Zanesville, Ohio, in 1859. He was educated in the public schools at the Massachusetts Institute of Technology. He began the study of architecture in 1876. Among the notable buildings which he designed are the Capitol of Minnesota at St. Paul; the Essex County court house at Newark, N. J.; the Agricultural Building at the Omaha Exposition; the Woolworth Building and the Custom House, New York; the Central Public Library at St. Louis; the Detroit Public Library; the New Haven Public Library; the Capitol of Arkansas, at Little Rock. He was appointed by President Roosevelt as a member of the Council of the Fine Arts, and was reappointed by Presidents Taft and Wilson. He was a member of the National Jury of Architecture at the Paris Exposition, and was a founder of the Architectural League of New York. He was also a member of many American and foreign architectural and art societies.

GILBERT, SIR HUMPHREY, an English navigator; born in Dartmouth, Devonshire, in 1539; educated at Eton and Oxford. Then, abandoning law for a career of arms, he did such good service against the Irish rebels as earned him knighthood and the government of Munster (1570), after which he saw five years' campaigning in the Netherlands. In 1576 appeared his "Discourse on a Northwest Passage to India," which was published by George Gascoigne, without his knowledge; two years later he obtained a royal patent to "discover and occupy remote heathen lands not actually possessed of any Christian prince or people." With his younger half-brother, Sir Walter Raleigh, he set out on an expedition (1578-1579) that failed. He set sail from Plymouth in June, 1583, and in August landed in Newfoundland, of which he took formal possession for Queen Elizabeth. He was shipwrecked and drowned Sept. 9, 1583.

GILBERT, SIR JOHN, an English painter; born in Blackheath, near London, in 1817; placed at a mercantile

house in the city; and later studied art. In 1836 he began to exhibit both in oil and water colors; and in 1852 he was elected an associate, in 1853 a member, in 1871 the president of the Society of Painters in Water-colors, receiving soon after the honor of knighthood. He also became an A. R. A. in 1872, an R. A. in 1876, and a Chevalier of the Legion of Honor. His oil paintings include "Don Quixote and Sancho Panza," "Education of Gil Blas," "Murder of Becket," "Joan of Arc Entering Orleans," "Crusaders," "Wolsey at Leicester," and "Morning of Agincourt." He died in Villers-sur-Mer, France, Oct. 6, 1897.

GILBERTINES, a religious order in the Roman Catholic Church, one of the few of English foundation. Its founder in 1148 was St. Gilbert, a native of Sempringham, in Lincolnshire. The rule of the order was mainly derived from that of the Canons Regular of St. Augustine. St. Gilbert also founded an order of nuns after the Benedictine institute. Both orders were approved, and had numerous convents in England at the time of the Reformation, when they shared in the general suppression.

GILBERT ISLANDS, a group of small islands in Australasia, situated on the equator, extending from longitude 172° to 177° East, southeast of the Marshall Islands. The group constituting a British colonial possession, comprises eighteen small islands with a total of 166 square miles, the largest being the island of Tapiteuea. Most of the islands are fertile and large quantities of copra are produced. Population about 27,000, including 450 Europeans.

GILBERTITE, a whitish, silky mineral; apparently an impure kaolinite. It occurs near St. Austell in Cornwall, England.

GILBOA (gil-bō'ä), a chain of hills between 500 and 600 feet high, overhanging the site of the ancient city of Jezreel, and rising between the fertile plain of Esdraelon on the W. and the green valley of the Jordan on the E. It is memorable as the scene of the defeat and death of King Saul and his three sons at the hands of the Philistines.

GILDER, JEANNETTE LEONARD, an American literary critic and editor, born in Flushing, L. I., N. Y., 1849. She was first associated with her brother, Richard Watson Gilder, in the editorial management of "Scribner's Monthly," now known as the "Century Magazine." Later she also became associated with another brother, Joseph B. Gilder, as editor of "The Critic," after which, in 1906, she became connected with "Putnam's Magazine." She wrote "Pen Portraits of Literary Women" (1887); "Essays from The Critic" (1882); "Authors at Home" (1889); "Autobiography of a Tomboy" (1900); "The Tomboy at Work" (1904); and other collections and compilations. In 1909 she established and edited "The Reader," a guide for book buyers. She died in 1916.

GILDER, RICHARD WATSON, an American editor; born in Bordentown, N. J., Feb. 8, 1844; received a private school education; served with the Union army during the Confederate invasion of Pennsylvania in 1863; was connected with the daily newspaper press and monthly periodicals till 1881, when he became editor-in-chief of "The Century." His publications, chiefly in poetry, include "The New Day"; "The Celestial Passion"; "Lyrics"; "Two Worlds"; "The Great Remembrance"; "In Palestine"; etc. He died Nov. 18, 1909.

GILDERSLEEVE, BASIL LANNEAU, an American classical scholar; born in Charleston, S. C., Oct. 23, 1831; graduated at Princeton in 1849, and studied in Germany for several years. He was professor of Greek and Latin at the University of Virginia from 1856 to 1876, when he was appointed Professor of Greek at Johns Hopkins University. He is the founder and editor of the "American Journal of Philology." Among his works are: "Persius" (1875); "Justin Martyr" (1875); "Odes of Pindar." He has published a Latin grammar and a volume of "Essays and Studies"; "Hellas and Hesperia" (1909); and with C. W. Miller "Syntax of Classical Greek from Homer to Demosthenes" (1900-1911); "Creed of the Old South" (1915).

GILEAD, a mountainous district on the E. side of the Jordan, bounded by the Hieromax (Yarmuk), Arabia, Moab and Ammon, and the Jordan. The district was given to the tribes of Manasseh, Gad, and Reuben, because of the multitude of their cattle, and as a frontier land which was exposed to invasion. There is mention of Gilead in Gen. xxxvii. Ramoth (Es-Salt), Jabesh, and Jazer are three of the cities mentioned in Scripture.

GILGAL (gil'gal), an ancient city near the Jordan, where the Israelites passed the river into Caanan, where they were circumcised and held the first Passover after leaving the desert (Joshua iv: 19). Here rested the tabernacle, till removed to Shiloh; here Samuel held court as judge of Israel, and here Saul was crowned. It is frequently mentioned in the Bible; a school of the prophets was

established here (II Kings iv: 38), yet it afterward became a seat of heathen worship (Amos iv: 4). Josephus places it within 2 miles of Jericho, but no traces of it are at this day extant.

GILGHIT, or **GILGIT** (gil-git'), a valley and district in Kashmir, India, on the S. slope of the Hindu Kúsh, and watered by the Gilgit, or Yasm, a tributary of the Indus.

GILL, DAVID, SIR a Scotch astronomer; born in Aberdeen, June 12, 1843; educated at Marischal College. He was chief of staff of Lord Lindsay's observatory, founded in 1870; in charge of Lindsay's expedition to Mauritius in 1874 to observe the transit of Venus and the opposition of Juno, by means of the heliometer, for the determination of the solar parallax. He determined the longitudes of Malta, Alexandria, Suez, Aden, Bombay, Seychelles, Reunion, Mauritius, and Rodriguez by cable and chronometers, and measured the first base-line for the Egyptian triangulation at the request of the khedive. In 1877 he was in charge of the expedition to Ascension to observe the opposition of Mars for parallax; and in 1879 appointed director of the Cape Observatory. In 1896-1897, he made the first geodetic survey of Natal, Cape Colony, and Rhodesia. He introduced cataloguing the stars by photographs. Wrote "History of the Royal Observatory, Cape of Good Hope" (1913). He died in 1914.

GILLAROO, a variety of the common trout, in which the coats of the stomach are said to be thickened like the gizzard of birds by feeding on shell-fish.

GILLES, ST. (san zhēl), a town in the department of Gard, France, 12 miles S. S. W. of Beaucaire. Its territory produces a strong red wine, which is exported.

GILLETTE, WILLIAM, an American playwright; born in Hartford, Conn., July 24, 1855. He is the author of several successful plays, in many of which he has assumed the leading parts. Among his best-known productions are: "The Professor" (1881); "Esmeralda" (1881), with Mrs. F. H. Burnett; "The Private Secretary"; "Held by the Enemy" (1886); "A Legal Wreck" (1888); "Too Much Johnson" (1895); and "Secret Service" (1896); "Sherlock Holmes"; "Clarice"; etc.

GILLINGHAM, a town of Dorsetshire, England, on the Stour, 22 miles W. of Salisbury. It is the center of a fruit-growing district. Near it are the "Pen Pits," thought variously to be quarry holes or prehistoric dwellings.

GILLMORE, INEZ HAYNES, an American author, born of American parents in Rio de Janeiro, Brazil, 1873; received her common school education in Boston, then took a special course in Radcliffe College, from 1897 to 1900. She was first married to Rufus Hamilton Gillmore, and later to William H. Irwin. Together with Maud Wood Park she founded the National College of the Equal Suffrage League. She is the author of "June Jeopardy" (1908); "Maida's Little Shop" (1910); "Phoebe and Ernest" (1910); "Janey" (1911); "Phoebe, Ernest and Cupid" (1912); "Angel Island" (1914); "The Ollivant Orphans" (1915); "The Lady of Kingdoms" (1917); "The Happy Years" (1919), and many short stories published in American magazines.

GILLMORE, QUINCY ADAMS, an American military officer; born in Black River, Lorain co., O., Feb. 28, 1825; graduated at West Point in 1849. He was promoted captain in 1861, and Brigadier-General of volunteers early in 1862. He displayed skill as an engineer by the capture of Fort Pulaski in April, 1862, and was appointed commander of the Department of the South in June, 1863. He made a successful attack on Morris Island in July, 1863, began to bombard Fort Sumter and Charleston in August, and took Fort Wagner in September; Fort Sumter was reduced to a ruinous condition, but its garrison continued to hold it till Feb. 17, 1865. General Gillmore commanded the 10th Corps near Richmond in 1864, and was brevetted Major-General U. S. A., in 1865. He died in Brooklyn, N. Y., April 7, 1888.

GILL NET, a net suspended in a stream, having meshes which allow the heads of the fish to pass, and which catch in the gills to prevent the fish from detaching itself.

GILL SAC, in ichthyology, one of the rudimentary gills constituted by sacs, occurring in the myxinoids and lampreys. A gill of the ordinary fishes is the homologue, not of a single gill sac, but of the continuous halves of two of them.

GILMAN, CHARLOTTE PERKINS, an American lecturer and writer, born in Hartford, Conn., 1860. In 1890 she began lecturing on ethics, economics and sociology, and especially on the place of women in the social structure. She is one of the chief exponents of modern feminism. Since 1909 she has edited and published "The Forerunner," a magazine dedicated to women and economics. She was the author of; "Women and Economics" (1898); "In This Our World"

(verse, 1898); "The Yellow Wallpaper" (1899); "Concerning Children" (1900); "The Home; Its Work and Influence" (1903); "Human Work" (1904); "What Diantha Did" (1910); "The Man Made World" (1910); "The Crux" (1911); "Moving the Mountain" (1911).

GILMAN, DANIEL COIT, an American educator; born in Norwich, Conn., July 6, 1831; was graduated at Yale College in 1852; Professor of Physical and Political Geography in Yale in 1856-1872; president of the University of California in 1872-1875. When Johns Hopkins University was founded in Baltimore, Md., in 1875, he was elected its first president and served in that capacity till 1901, when he resigned and became editor-in-chief of the revised edition of the "International Cyclopædia." In 1896-1897 he was a member of the commission to settle the boundary line between Venezula and British Guiana. His publications include "Life of James Monroe"; "University Problems"; "Introduction" to DeTocqueville's "Democracy in America," etc. In 1901 Gilman was elected president of the Carnegie Institute at Washington. He died on Oct. 18, 1908.

GILMAN, NICHOLAS PAINE, educator; born in Quincy, Ill., Dec. 21, 1849; was graduated at Harvard Divinity School in 1871; editor of the Boston "Literary World" in 1888-1895; then became Professor of Sociology and Ethics in the Meadville Theological School. His publications include "Profit-Sharing Between Employer and Employee"; "Socialism and the American Spirit." He died in 1912.

GILOLO, or **JILOLO** (jē-lō'lō), an island of the Molucca group in the Indian Archipelago; area 6,500 square miles. It is of singular form, consisting of four peninsulas, radiating from a common center, and having large bays between. It is rugged and mountainous. The principal productions are sago, cocoanuts, spices, fruits, edible birds'-nests, horses, cattle, and sheep. The original inhabitants, called Alfoories, have been gradually pressed into the interior by the Malays.

GILSONITE, a variety of asphalt found as a deposit in Utah, stated to be the purest bitumen occurring naturally. Its color is a brilliant, lustrous black, but on exposure to air it breaks down into a brown powder. Specific gravity, 1.067. Soluble in alcohol, turpentine and carbon bisulphide. Used in the manufacture of varnishes, and for insulating and waterproofing.

GIN, a compounded spirit, prepared either by redistilling plain spirit with juniper berries, coriander seeds, angelica root, etc., or by adding various essential oils to rectified spirit.

In machinery, a portable hoisting machine whose frame is a tripod, one leg being movable so as to vary its angle of elevation, and thus determine the height of the apex; the other two legs preserve their relative distance, and form standards for the drum, round which the rope is wound by power applied to the handspikes. For heavy weights a fall and tackle is used; and for hoisting a bucket from a well or mine, simply a couple of pulleys to change the direction of motion of the rope. Also, a machine for separating cotton fiber from the seeds.

GINGER, in botany, *Zingiber officinale*, common or narrow-leaved ginger. It is a native of India, but is cultivated in most tropical countries. There is a broad-leaved ginger, *Z. zerumbet*, also a native of India. It is used externally for cataplasms and fomentations, but is not eaten.

In ordinary language, the dry, wrinkled rhizomes of the ginger-plant. The pieces, or as they are called races, are usually from 2 to 4 inches long, branched, flat, and of a pale buff color. The chief varieties imported into the United States are Jamaica, Cochin, Bengal, Japan, and African. The first three are scraped gingers, and of these Jamaica is the most esteemed owing to its color and flavor. Ginger is an agreeable aromatic and a valuable stomachic; but is more largely used as a condiment than as a medicine. Preserved ginger, so largely imported from China in jars, consists of the young rhizomes boiled in syrup.

GINGKO, the Japanese name of a coniferous tree of the yew alliance, with very characteristic leaves, in form and variation recalling the leaflets of the maiden-hair ferns. The yellow, drupe-like seeds reach the size of a walnut, and are largely eaten throughout China and Japan. The Japanese esteemed the tree as sacred, and planted it round their temples. The tree is diœcious, but the Chinese sometimes plant several male and female trees close together, so that male and female flowers appear to arise on the same tree.

GINSENG (Chinese *Gensen*—"that which resembles a man"), a root used in China as a medicine. It is the root of a species of *Panax* (order *Araliaceæ*). *P. Ginseng* of Chinese Tartary is similar to *P. quinquefolium* of North America, which is exported to China. The ginseng of Korea is most valued, and is carefully cultivated in that country. The root is

mucilaginous, sweetish, also slightly bitter and aromatic.

GIOBERTI, VINCENZO (jō-ber'tē), an Italian writer; born in Turin, April 5, 1801; was ordained priest in 1825, and soon afterward was appointed court chaplain at Turin. He was banished in 1833 on account of his liberal tendencies, remaining a few years in France, and taught philosophy in a public school at Brussels. His first writings were philosophical, "The Theory of the Supernatural" (1837); the "Introduction of High Philosophical Research" (1840). In 1842, "Philosophical Errors of Antonio Rosmini"; and next the treatises, "The Beautiful" and "The Good," on the principles, respectively, of taste and morals. In 1843 appeared the most celebrated of his works, "Moral and Civil Principles of the Italians." In 1848 Gioberti was recalled to his native country amid popular acclamation, and later, on being elected deputy for Turin, took an active part in all the great political questions, and finally became prime minister of Sardina. In 1849 he returned into voluntary exile, and spent his last years in Paris in writing his "The Civil Renovation of Italy." He died in Paris, Oct. 26, 1852.

GIOLITTI, GIOVANNI, an Italian statesman. He was born at Mondovi, province of Cuneo, in 1843, and was educated at Turin. He held a post in the Ministry of Finance for eight years, after which he was elected to the Chamber of Deputies. In 1889 he became Minister of the Treasury, and in 1890 Minister of Finance, becoming in 1892 President of the Ministry, being compelled to resign in the following year as a result of his relations with a director of the Banca Romana, whom he had made senator, and who had been guilty of issuing duplicate notes and corrupting government officials. In 1901 he was back in power again, becoming Minister of the Interior, in 1903 resigning and forming a ministry of his own. Resigning in 1905, he returned as head of the ministry in 1906, continuing till 1909, when he was followed by Sonnino, whom he succeeded in 1911. He resigned again in 1914, and when the World War broke out was against the participation in it of Italy. As a result, though regarded as almost Italy's most capable statesman, he did not figure prominently in the affairs arising out of it. His conduct of affairs was always characterized by retrenchment in expenditure. He brought in much legislation tending toward the amelioration of the condition of the working classes, and a large part of his influence has come from the support he found among them.

GIORDANO, LUCA (jōr-dä-nō), an Italian painter; born in Naples about 1632; a scholar of Spagnoletto, studied the great Italian masters at Rome, and became the pupil of Peter of Cortona. He imitated the greatest masters so well that even connoisseurs were imposed upon. In 1679 he was employed by Charles II. to ornament the Escurial, and at the court of Spain he became a great favorite. After the death of Charles II. he returned to his native country. His most celebrated pieces are his frescoes, in the Escurial, at Madrid, Florence, and Rome. Some of his finest paintings are at Dresden. He died in Naples, Jan. 12, 1705.

GIORGIONE, GIORGIO BARBARELLI (jōr-jō'ne), an Italian painter; born in Constelfranco about 1477. Several of his oil paintings have been preserved, and are at once recognizable by the firmness of touch, vividness of coloring, and the striking tone of relief which they display. The Museum at Paris contains four of his works, viz.: "Salome Receiving the Head of John the Baptist"; "Jesus Sitting on His Mother's Knees"; "The Rural Concert"; and "Gaston de Foix." His chef-d'œuvre is a picture of "Christ Carrying His Cross," preserved at Venice. He died in Venice, in 1511.

GIOTTO (jot'tō), properly **AMBROGIOTTO** or **ANGIOLOTTO BONDONE**, an Italian painter; born in Vespignano, in 1266; and in his boyhood tended cattle. But having been seen by Cimabue, as he was drawing figures of his sheep upon a piece of slate, that artist carried him to Florence and taught him painting. Among his most celebrated pieces is the "Navicella" at Rome, a picture of Peter walking upon the waves, some fresco paintings at Florence, also the history of St. Francis, at Assisi, and several miniatures. He was equally successful as a statuary and architect. He died in Florence in 1336.

GIPSIES, a nomad Eastern race, the members of which came to Europe by way of the Isthmus of Suez and Egypt. It is now proved that they are from India, and apparently from that part of it adjacent to the river Indus, with the languages of some tribes inhabiting the banks of which their tongue best agrees. A tribe near the mouth of the Indus is called Tchinganes, which is almost exactly the same as Tchingenes, by which name these wanderers are known in Turkey and the Levant. They call themselves Sind, the name of the country through which the Indus flows in the lower part of its course. They are believed to have left their native country in dread of Timur Beg, better known as

Timoor the Tartar, or Tamerlane, and first appeared in Paris in the end of August, 1427.

GIPSYWORT, or **GYPSYWORT**, a labiate plant, with dense whorls of flowers, white, with purple dots. It is about two feet high, and grows in ditches and by river banks.

GIRAFFE, the camelopard, *Camelopardalis giraffa*. It has an affinity to the camel; but its resemblance to the leopard, which is only in its color and spots, is an analogy and no more. It has two small frontal horns and one central horn. The neck is very long. The tongue is



GIRAFFE

long and prehensile, and is used for stripping leaves off trees. The forelegs are very long, making the animal stand 15 to 18 feet high. It lives in small herds, and gallops in a ludicrously clumsy manner. Its flesh is good. The hide makes excellent leather. It is found in Nubia, Abyssinia, and the Cape of Good Hope.

GIRARD, a town of Ohio, in Trumbull co. It is on the Erie, Baltimore and Ohio, and the Pennsylvania railroads. Its industries include the manufacture of iron and steel products, leather, and chewing gum. Pop. (1910) 3,736; (1920) 6,556.

GIRARD, STEPHEN, an American philanthropist; was born near Bordeaux, France, May 24, 1750. In 1769 he settled as a trader in Philadelphia, where he established the Second National Bank, and advanced several millions to the United States treasury during the War of 1812. In the yellow fever epidemic in 1793 he nursed many of the sick in the hospitals; and in public matters his generosity was remarkable. Among other bequests he left $7,500,000 for the erection and maintenance in Philadelphia of a college for male white orphans. He died in Philadelphia, Pa., Dec. 26, 1831.

GIRARD COLLEGE, an institution in Philadelphia, Pa., for the education of poor white orphan boys; founded under the will of Stephen Girard, and opened Jan. 1, 1848. By a provision in the will no ecclesiastic, missionary, or minister of any sect whatever is to have any connection with the college. In 1919 it reported: Professors and instructors, about 100; students, 1,540; volumes in the library, about 25,000; endowment and plant, $40,000,000; president, Cheesman A. Herrick, Ph. D., LL. D.

GIRGEH (jēr'je), a town of Egypt, on the Nile, 10½ miles N. of the ancient Abydus. It was here that the discontented Mamelukes rallied against Mehemet Ali. Outside the town is a Roman Catholic monastery, said to be the oldest in Egypt.

GIRGENTI (jēr-jen'tē), a town of Sicily, near the site of the ancient Agrigentum, on the S. coast, 84 miles S. S. E. of Palermo. The town is the seat of a bishop, and has a trade in grain, oil, fruit, sulphur, sumach, salt, and fish. Its port is Porto Empedocle. Pop. of district, 409,000.

GIRL SCOUTS OF AMERICA. A national organization having for its object the general welfare of girls, giving them through wholesome pleasure those habits of mind and body which will make them useful, responsible women, ready and willing to take a definite part in the home, civic, and national affairs of the country. The association was founded in 1912, and the movement became popular, numbering in 1920 over 82,000 members, representing an increase of 40 per cent. over the preceding year. The organization is non-sectarian and non-partisan. The activities are designed to bring to the girls the opportunity for an all-round life, indoors, outdoors, at home, and in the community. Woman is recognized as a producer, a consumer, and a citizen, and the girl scout is trained toward these ends. Throughout all the activities is the definite ideal of character building. The governing body is the

National Council, composed of representatives from local councils and other members elected by the National Council. National headquarters are maintained in New York to carry out the policies of the National Council. A local council may be organized in any community. This is a body of men and women, representing the schools, churches, social and civic organizations, playgrounds, newspapers, and such bodies as the Chamber of Commerce and Rotary Clubs. This council is organized for the purpose of promoting and supervising girl scout units in the district. The unit of organization is the patrol of eight members each. One or more patrols form a troop, and they are grouped whenever possible according to age and congeniality. Each patrol has a leader and a corporal, and each troop a captain. The captain may choose lieutenants to assist her. It is advisable that a troop of two patrols have a lieutenant, and that for every additional two patrols another lieutenant be secured. Each troop selects for its name a flower, tree, shrub, or bird. The members wear the emblem over the left pocket of their uniforms. Troops may be formed in connection with any church, school, playgound, settlement, or other institution or organization. Unattached troops are also successful. Troop meetings are held weekly, with the program fairly divided between recreation and education. Any girl from ten to eighteen years of age, who is willing to subscribe to the promise and laws required of candidates, to the effect that they will try to do their duty to God and country and make certain resolutions, may become a scout after passing a "tenderfoot" test. Captains are over 21 years of age and are commissioned by the National Headquarters on paying a fee of 50 cents. There is a fee of 25 cents for each scout, and a subscription to the "American Girl" magazine is also required. Parallel organizations exist in Hawaii, Russia, Norway, Central America, Alaska, Denmark, the Philippines, West Indies, Great Britain, Palestine, Canada, Australia, Poland, Serbia, Belgium, Italy, Portugal, New Zealand, and China. In France a similar organization is called "Les Eclaireuses," and in England there are Girl Guides. In 1920 a campaign was set going for funds to aid the organization.

GIRONDE (zhē-rônd'), a maritime department in France; formed of part of the old province of Guienne; area, 3,761 square miles; capital, Bordeaux. It is watered mainly by the Garonne and the Dordogne, and by the Gironde, the estuary formed by the union of these two rivers. The E. two-thirds of the surface consists of a fertile hill and dale region; the remainder, in the W. next the ocean, belongs to the Landes. In the E. and N. E. the soil is chiefly calcareous. Wine is the staple product of the department. Grain, vegetables, potatoes, pulse, and fruit are grown largely. On the downs or sandhills of the W. coast there are extensive plantations of pine, from which turpentine, pitch, and charcoal are obtained. The principal manufactures are salt, sugar, wax candles, porcelain, and glass, chemical products, paper and tobacco. Pop. about 830,000.

GIRONDIST (ji-ron'dist), or **GIRONDIN** (-ron'din); the name of a great political party in France; one of the most powerful factors in the earlier part of the first French Revolution. When the Legislative Assembly met in 1791, it was found to contain representatives of the upper, the middle, and the lower classes. The Girondists were the party of the middle classes, and were republican in sentiment. They obtained their designation from the fact that their most celebrated leaders, Vergniaud, Guadet, and Gensonné, were members for the department of the Gironde, originally lawyers in the law court of Bordeaux. In 1791 they were the most powerful party in the Assembly, and for a time shaped the policy of their country. When conservative Europe threatened France with invasion, it was the Girondists who, in April, 1792, declared war, the Jacobins deprecating hostilities, as fearing the result. To overcome their monarchic rivals, the Girondists coquetted with the last-named party, and found that they had gained, not a servant, but a master. The quarrel between the two arose after the massacres perpetrated in August and September, 1792, and the extreme revolutionists ultimately prevailing, an armed mob on May 31, 1793, assailed the Convention, and demanded the imprisonment of 29 Girondist deputies. These were arrested on June 2, and 21 of them were guillotined on Oct. 31. Others were subsequently put to death; a few escaping, reappeared in the Convention after the fall of Robespierre.

GIRTON COLLEGE, a noted college for women in England, instituted at Hitchin in 1869, but removed to Girton, near Cambridge, in 1873. Instruction is given in divinity, modern languages, classics, mathematics, moral science, natural science, including physiology and chemistry, history, and vocal music. Degree certificates are granted to those who satisfy their examiners as to their pro-

ficiency according to the standard of the examinations for the B. A. of Cambridge University. In 1919 there were 27 teachers and 170 students.

GISORS (zhē-zōr′), a town in the French department of Eure, on the Epte, 43 miles N. W. of Paris. Its double-aisled church, whose choir dates from the 13th century, has a splendid flamboyant portal; and the octagonal donjon of the ruined castle was built by Henry I. of England. Here Richard I. defeated the French in 1198; his watchword, "*Dieu et mon Droit*," has ever since been the motto of the royal arms of England. Pop. about 5,500.

GISSING, GEORGE, an English novelist; born in Wakefield, in 1857. He has made a remarkable study of the London masses, from the ranks of skilled labor to the most noisome human refuse of the slums, the result being half repulsive and wholly powerful; particularly in "The Nether World," "New Grub Street," "Demos," and "Sleeping Fires." He died Dec. 28, 1903.

GITSCHIN (gich′in), a town of Czecho-Slovakia, 60 miles N. E. of Prague. Gitschin was once the capital of the duchy of Friedland, and here Wallenstein built a splendid palace in 1630. On June 29, 1866, the Austrians were severely defeated here by the Prussians.

GIULIO ROMANO (jō′lē-ō rō-mä′no), properly GIULIO PIPPI DE' GIANNUZZI, an Italian artist; born in Rome about 1492; assisted Raphael in the execution of several of his finest works, such as the series of the so-called Raphael's Bible in the loggie of the Vatican and the "Benefactors of the Church" in the Incendio del Borgo, and at Raphael's death he completed the "Battle of Constantine" and the "Apparition of the Cross" in the Hall of Constantine in the Vatican. He built the Villa Madama, and adorned it with a fresco of Polyphemus. In 1524 Giulio accepted the invitation of Federigo Gonzaga, Duke of Mantua, to carry out a series of architectural and pictorial works, and restored the Palazzo del Te, the cathedral, the streets, and a ducal palace at Marmirolo, a few miles from Mantua. Among the pictorial works of this period were the "History of Troy," in the castle, and "Psyche," "Icarus," and the "Titans," in the palace. In Bologna he designed the façade of the Church of St. Petronio. Perhaps the best of his oil pictures are the "Martyrdom of St. Stephen," at Genoa; "A Holy Family," at Dresden; "Mary and Jesus" and the "Madonna della Gatta." Giulio died in Mantua, Nov. 1, 1546.

GIURGEVO (jör-jā′vō), a town of Rumania, on the Danube, opposite Rustchuk, 40 miles S. S. W. of Bucharest, of which town it is the port. It imports iron and textile goods, coal, and spirits, and exports corn, salt, and petroleum. It was originally settled by the Genoese in the 14th century, who called it St. George. Since 1771 the town has played an important part in all the wars between the Turks and the Russians. Pop. about 15,000.

GIVENCHY, a village of France, S. of Armentières, and midway between Béthune and La Bassée, which was the scene of much fighting in the war. It was at first defended by an Indian brigade, which was driven out at the beginning of the war by the Germans. It remained a contested point while the war lasted.

GIVET (zhē-vā′), a town and fortress in the French department of Ardennes, on both banks of the Meuse, 31 miles S. of Namur in Belgium, and 193 N. E. of Paris. The citadel of Charlemont, on a rock 700 feet above the stream, was reconstructed by Vauban. There are manufactures of lead pencils, and sealing-wax, copper-wares, soap, etc. In August, 1914, the British forces held the town for some time against the Germans, who occupied it in the last days of the month. Pop. about 7,700.

GIVORS (zhē-vor′), a town in the French department of Rhône, on the river Rhône, 14 miles S. of Lyons. Glass, especially bottles, and silk and iron goods are extensively manufactured, and a considerable trade in coal is carried on.

GIZZARD, a muscular division of the stomach in birds; it is an elongated sac in the body of birds just below the liver, and having two openings above, the one into the duodenum and the other into the proventriculus. The gizzard of the raptorial bird is thin and feeble, while that of the graminivorous bird is strong, with thick and muscular walls, the whole lined with a thick horny epithelium.

GLACIAL PERIOD, a period or epoch during which ice largely prevailed, the climate, in what are now temperate latitudes, being polar. It commenced during the Newer Pliocene, and terminated before the close of the Post-Pliocene age. Arctic conditions did not prevail unintermittingly during all this time. Two distinct divisions of the glacial period or distinct glacial periods are traceable in the Alps, the earlier one the more severe

of the two. It was during the glacial period that the Alpine plants, now found on the summit of European mountains, passed S. from the Arctic regions. During the later of the two glacial periods man existed; whether he did so during the earlier one is a matter of dispute. See GEOLOGY.

GLACIER (glas'i-er), a river of ice. A glacier commences primarily as a frozen mass of snow, formed above the line of perpetual congelation, and consolidated partly by pressure and partly by the freezing of water infiltered into it from its surface. In the Swiss Alps the glaciers are between 20 and 30 miles long, their greatest breadth 2 or 3 miles, and their depth more than 600 feet. Why the glacier descends has been a very disputed question. Tyndall attributed it chiefly to regelation, that is, to parts of it melting and freezing again. When, in descending a mountain-side, the glacier has to force its way through a narrow channel, the brittle ice is crushed and broken, but by virtue of "regelation" it freezes anew when it has cleared the obstruction. Tyndall imitated the whole process artificially on a small scale, and his is now the accepted explanation of glacier movement. As a glacier descends, it carries with it stones, which, on its melting, are deposited in a moraine. It makes also a dome-shaped mass of smoother rock, called in Switzerland roches moutonnées.

GLACIER LAKE, a lake produced temporarily or permanently by a glacier. It is noteworthy that glacier lands like Switzerland are also lands abounding in lakes.

GLACIER, NATIONAL PARK. See NATIONAL PARKS.

GLACIS (glā'sis), in fortifications, the superior slope of the rampart of the covered way, or, where the rampart does not exist, the declivity immediately in front of the ditch of a work, forming a gentle slope toward the country, and protecting the revetment of the escarp from the fire of an enemy.

GLADBACH, or **MÜNCHEN** (mün' chen) **GLADBACH**, a town of Rhenish Prussia, 16 miles W. of Düsseldorf. It is the center of the Rhenish cotton-spinning industry and has manufactures of silk, wool, linen, and paper, cotton printing works, dye works, bleachfields, iron foundries, machine shops, breweries, and brickworks. Gladbach, which has been a town since 1366, was formerly the seat of an important linen trade; the cotton industry was introduced in the end of the 18th century. The town possesses a church dating from the 12th and 13th centuries, the crypt from the 8th. Pop. about 65,000.

GLADDEN, WASHINGTON, an American author; born in Pottsgrove, Pa., Feb., 11, 1836; was graduated at Williams College in 1859; ordained in the Congregational Church, and became pastor of the First Congregational Church in Columbus, O., in 1882. His publications include "Plain Thoughts on the Art of Living" (1868); "Workingmen and Their Employers" (1876); "The Young Men and the Churches" (1885); "Burning Questions" (1889); "Social Facts and Forces" (1897); "The Christian Pastor" (1898); "Where Does the Sky Begin?" (1904); "The New Idolatry" (1905); "The Church and Modern Life" (1908); "Recollections" (1909); "Live and Learn" (1914); "Commencement Days" (1917). He died in 1918.

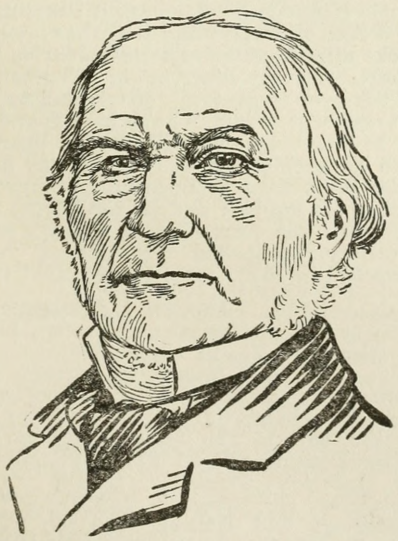
GLADIATOR, one of a class of men whose profession was to fight in public for the entertainment of the people. They were armed with deadly weapons, and usually fought in pairs. The numbers of these men were principally recruited from prisoners of war, or refractory slaves sold by their masters to the lanista, or trainer. Malefactors also were occasionally forced into fighting as gladiators, and occasionally Roman citizens offered themselves voluntarily for hire, and to such the specific term auctorati was applied, their pay being called auctoramentum. Under the more worthless and dissolute emperors, equites, priests, and senators did not scruple to contend in the arena, in the hope of attracting the attention and gaining the favor of the prince; and even high-born women were found who consented to pander to the appetite for novelty, by fighting with each other or with dwarfs. The representatives of different nations were frequently matched against each other, and the comparative efficiency of their weapons, offensive and defensive, was thus put to the test.

GLADIOLUS (-ō'lus), a genus of *Iridaceæ*, with beautiful spikes of flowers, sword-shaped leaves and corms or bulbous rhizomes. They are propagated by offset corms or from seed; in this way innumerable hybrids have been produced. The hardy European forms are well adapted to the mixed border, wild garden or shrubbery in dry and sunny situations. Among the leading Cape forms are *G. cardinalis* (red), *psittacinus* (yellow with purple spots), *floribundus* (purple and white), etc., and these have given rise to numerous hy-

brids—*e. g.* the first two to *G. gandavensis*, which again stands at the head of many new series of hybrids and varieties. The scarlet *G. brenchleyensis* is similarly a standard form. The corm of *G. communis* was formerly officinal; and the Hottentots dig up some of the Cape species for the sake of their starchy corms.

GLADSTONE, HERBERT JOHN, 1st VISCOUNT, an English statesman, son of William E. Gladstone, born at London, in 1854. He was educated at Oxford and from 1877 to 1880 was lecturer on history at Keble College. In 1880-1881 he was private secretary to his father, and in the latter year was appointed Lord of the Treasury. He was successively Financial Secretary of War, Under-Secretary of the Home Office, and First Commissioner of Works. From 1899 to 1906 he was Chief Whip to the Liberal Party, and from 1905 to 1910 was Secretary of State for Home Affairs. He was a member of Parliament from Leeds from 1880 to 1909. In the latter year he was appointed First Governor-General of South Africa, serving until 1914.

GLADSTONE, WILLIAM EWART, an English statesman, born in Liverpool, Dec. 29, 1809; was graduated at the University of Oxford in 1831; became a Tory member of the House of Commons



WILLIAM E. GLADSTONE

in 1832; appointed Junior Lord of the Treasury in 1834, and Under-Secretary of State for the Colonies in 1835. He made his first great speech in 1852 in reply to Disraeli's famous address against the Liberals. Soon after this Gladstone became Chancellor of the Exchequer; and upon rendering his first budget made a speech which enthralled the house and gave him a high reputation as a speaker on the most difficult financial problems. In 1865 he was appointed Speaker of the House of Commons, but continued in that office for one year only when the Government resigned. He was first prime minister in 1868-1874, during which period he introduced three bills dealing with the great difficulties of Ireland. The first measure, that of the disestablishment of the State Church of Ireland, was adopted by a large majority; the second, having to do with the Irish land laws, was also adopted; but the third, treating of Irish education, was defeated, on which the ministry resigned. Mr. Gladstone was again prime minister in 1880-1885, in 1885-1886, and in 1892-1894. His publications include "The State in Its Relations with the Church" (1838); "Studies on Homer and the Homeric Age" (1858); "The Vatican Decrees" (1874); "Gleanings of Past Years" (1879); "The Irish Question" (1886); etc. He died in Hawarden Castle, Flintshire, North Wales, May 19, 1898.

GLAMMIS, a village of Scotland, five miles S. W. of Forfar. Near it is Glammis Castle, in which is still shown the chamber in which Malcolm II. was assassinated in 1034. It was one of the castles of Macbeth, and gave him his hereditary title of Thane of Glammis.

GLAMORGANSHIRE, a county of Wales, in the southernmost part. Its chief industries are the mining of iron and coal. It has also extensive agricultural and cattle raising interests. The chief towns are Cardiff, the capital, Merthyr-Tydfil, and Swansea. The county has an area of 809 square miles. Pop. about 1,200,000.

GLAND, a term at first vaguely applied to any smooth, round viscus, but which is now limited to such of these as secrete—*i. e.*, separate by a process of cell growth, certain constituents of the blood which are afterward poured out from the gland by means of a duct. They are divided into lymphatic and secreting glands.

Lymphatic glands are bodies resembling glands in form, but not possessing ducts for secretion, so that their products must be conveyed to them by lymphatic or sanguiferous vessels. Examples, the spleen, the thyroid body, the thymus gland, the suprarenal capsules, the pituitary body, the follicular glands

at the root of the tongue and the lymphatic glands.

Secreting glands are the typical kind of glands to which the name is now very frequently restricted. They collect and discharge at particular parts various matters derived from the organism, that these may be further employed for special purposes in the economy, or simply eliminated as redundant material or waste products. In the latter case the term used is excretion. In this process the nucleated cell takes a prominent part. When there is a simple recess formed of secreting membrane, the gland is said to be simple. Examples of this structure occur in the mucous membrane of the stomach, the intestines, etc. When the cavity is subdivided as well as extended with the view of increasing the secreting surface, the gland is said to be compound. The latter are again subdivided into first tubular and second sacular or racemose glands. The glands of the testicle and those of the kidney are tubular; the salivary, lachrymal, and mammary glands, and most of the glands opening into the mouth, the fauces, and the windpipe are racemose glands.

In botany cells or aggregations of cells distinguished from those in their neighborhood by containing resinous, oily, sugary, or fragrant substances. The walls of the cells generally become degenerated, and are ultimately dissolved, a cavity being thus formed as seen in the rind of the orange and lemon. In other cases the secretion is discharged externally. Ordinary glands occur in almost all the tissues of plants.

GLANDERS, a disease among horses, indicated by a discharge of purulent matter from one or both nostrils, with a hard enlargement of the submaxillary glands. The disease is rarely if ever cured.

GLARUS (glä'rös), a canton of Switzerland, bounded by the cantons of St. Gall, the Grisons, Uri, and Schwyz; area, 267 square miles; capital, Glarus. It is an Alpine region, trenched by the valley of the Linth or Limmat and its lateral vales, and rising in its S. W. corner, in the Tödi peak, to an altitude of 11,887 feet. The rearing of cattle and the manufacture of cotton and woolen goods are the chief occupations of the people. The green cheese called Schabziger is wholly made here. Pop. about 34,000.

GLARUS, a town and capital of the Swiss canton of Glarus; 43 miles S. E. of Zurich. It was founded by an Irish monk, Fridolin, in the end of the 5th century. Zwingli was pastor here from 1506 to 1516. Glarus, having been peopled by German settlers, passed after various changes into the possession of the dukes of Austria, but ultimately secured its independence by the victories of Näfels in 1352 and 1388. In 1450 it joined the Swiss Confederation. Pop. about 5,000.

GLASGOW, a city of Lanark co., Scotland; on the river Clyde, 42 miles W. of Edinburgh; the most important and populous manufacturing and commercial city of Scotland. Area with extensions is now (1920) 19.183 square miles. The city contains many public buildings, among which the most celebrated are the cathedral of St. Mungo, a splendid specimen of Gothic architecture, begun in 1123; the Court House, Royal Exchange, Traders' Hall, Town Hall, and the Royal Infirmary. It contains a celebrated university, founded in 1450. There are besides the Anderson College, the College of Physicians, Mechanics' Institute, and the Mitchell Library (1911), the largest public reference library in Scotland. The manufactures include cottons, bandana handkerchiefs, muslins, soap, cordage, flint-glass, and cudbear. Glasgow is also noted for its ship-building and engineering establishments, chemical works, type-foundries, and almost every kind of production in the mechanical arts. The Clyde is navigable for vessels drawing 7 or 8 feet of water; and the wharves and docks afford extensive accommodation for vessels of every description. The origin of Glasgow is generally attributed to St. Mungo, who is said to have here founded, in 560, a bishopric, afterward erected into an archiepiscopal see. It was here that Watt first commenced to improve the steam engine; and on the Clyde, the "Comet," the first boat in Europe successfully propelled by steam, was launched in 1812. Pop. (1918) 1,111,428.

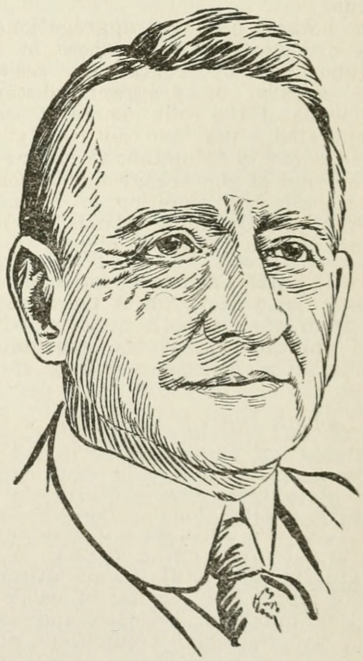
GLASGOW, ELLEN ANDERSON GHOLSON, an American novelist, born in Richmond, Va., in 1874. While still a young girl she began to attract attention as a fiction writer, portraying the change from the old order to the new in the South. She wrote "The Descendant" (1897); "Phases of an Inferior Planet" (1898); "The Voice of the People" (1900); "The Miller of Old Church" (1911); "Virginia" (1913); "Life and Gabriella" (1916); "The Builders" (1919).

GLASGOW, UNIVERSITY OF, a university of Scotland. It was founded in 1450 by Bishop Turnbull, and is, both in respect to its age and for the number of

its students, the second university of Scotland. Throughout the many years of its existence it has gradually acquired much property from grants made by royalty as well as from gifts by private individuals. James I. of England issued a new charter to the institution. Parliament reorganized it by special acts in 1858 and 1889. In 1864 the buildings then occupied by the university were sold and new buildings were erected overlooking Kelvin River. They were opened in 1870 and many additions have been made since then. The university is now a corporation, consisting of a chancellor, vice-chancellor, rector, principal, dean of faculties, professors, and students. The property of the institution is administered by the university court, consisting of the rector, the principal, the lord provost of Glasgow, and various assessors representing both the university and the city. This body also appoints and regulates professors and acts as a court of appeal from the senate. The latter body consists of the principal and professors, who regulate teaching and discipline. The general council, consisting of a number of ex-officio members and of all masters and doctors, meets twice a year for the purpose of revising the business of the university, elects the chancellor, four of the assessors, and, together with the general council of Aberdeen University, one member to Parliament. The Chancellor, who in 1920 was the Earl of Rosebery, is elected for life. The rector, whose duties are entirely honorary, is elected triennially by the students. He is usually a man distinguished in politics or letters, and the office in 1920 was held by Rt. Hon. A. Bonar Law. At times this office is conferred on foreigners, as in 1915, when the students elected President Poincaré of France. The university has faculties of arts, science, medicine and surgery, divinity and law. There are many scholarships, exhibitions and fellowships, some of great age and considerable value. The university has an important library of about 250,000 volumes, botanical gardens, an observatory, many special libraries and collections, the most famous of the latter being the Hunterian collection of coins, medals, and anatomical preparations. Among the graduates and teachers of the university are to be found some of the most illustrious Scotch names. Since 1893 women are admitted and in that year Queen Margaret College for Women became part of the university. In 1919-1920 there were 164 teachers and 3,900 students. The principal was Sir Donald MacAllister.

GLASPELL, SUSAN (MRS. GEORGE CRAM COOK), an American author, born in Davenport, Ia., 1882. After graduating from Drake University, she took a post-graduate course in the University of Chicago. In 1913 she married George Cram Cook. For some time she was State house and legislative reporter; she then began to attract attention by her short stories published in the magazines. She was identified with the Little Theater movement, through the Provincetown Players, and wrote a number of one-act plays. Her fiction is rather emotional and sentimental. Among her works are: "The Glory of the Conquered" (1909); "The Visioning" (1911); "The Lifted Masks" (1912); "Fidelity" (1915); "Trifles" (1917); and, in collaboration with her husband, "Suppressed Desires" (1917). Among her plays the most noteworthy is "Bernice" (1920).

GLASS, CARTER, an American public official; born at Lynchburg, Va., Jan. 4, 1858. He received his education in public and private schools in Lynchburg; mastered the printing trade, and entered



CARTER GLASS

the field of journalism through the road of the printing office, becoming owner of the "Daily News" and the "Daily Advance," morning and evening papers of Lynchburg, after eight years as a print-

er. In 1899 he entered politics as a member of the Virginia Senate; served successively in that office until 1902 when he became a member of the 57th Congress for the unexpired term of P. J. Otey. Re-elected to the 58th Congress, he continued to serve in Congress until, in 1920, he was elected U. S. Senator from Virginia, having previously been appointed to the unexpired term of Thomas S. Martin, deceased. His most conspicuous public services include his connection with the national banking legislation, as co-sponsor of the Owen-Glass Bill which became law in 1912. He was Secretary of the Treasury from Dec. 1918-Nov. 1919, and was elected U. S. Senator for the term 1919-1925.

GLASS, a hard, brittle, transparent substance, formed by fusing together mixtures of the silicates of potash, soda, lime, magnesia, alumina, and lead in various proportions, according to the quality or kind of glass required.

Flint glass is used in making table ware and many articles of domestic furniture and fittings. Crown and flint glass are combined in the manufacture of achromatic lenses.

Plate glass is made by pouring it upon a table which has a marginal edge of a height equal to that designed for the thickness of the glass. A roller travels over the table, on the ledges, and flattening out the glass, which is thus made of equal thickness throughout.

Toughened glass is made by heating till it is about to soften, and then plunging it into a bath of oil at a greatly lower temperature. Usually, a mixture chiefly of oily substances, such as oils, tallow, wax, resin, and the like, is put in the bath; and some manufacturers who worked the process for a time dropped the newly made glass vessels, while still hot, into the oleaginous mixture, by which plan neither reheating nor annealing by the ordinary process is required. After the articles acquire the temperature of the bath, they are removed.

Painted or stained glass is of two styles, enamel and mosaic glass. In enamel glass proper, certain fusible pigments are painted on a sheet of white glass, which is then fired, and the result is a picture the tints of which even in the high lights are not wholly transparent. A modification of this method produces its picture partly by enameling on white glass partly by the use of pot-metal glass, the color of which is heightened or modified by the use of enamels. Mosaic glass is made from a design wherein the drawing is given and the colors indicated, which is the working drawing of the glass painted. From this working drawing a kind of map is made which gives the various pieces of the mosaic. The glazier cuts these pieces out from sheets of glass of various colors, and hands them back to the painter, who proceeds first to paint the leading lines with a solid opaque enamel, the coloring matter of which is an oxide of iron. This being done the pieces of glass are stuck together temporarily (by means of wax) on a glass easel, and the painter slightly shades his bold traced lines with the same opaque color; using sometimes washes, and sometimes hatching of lightly laid-on lines, as in a black and white drawing on paper. Sometimes both washes and hatching are used, and the washed shadows are stippled. In any case the object of the method of shading is to keep the shadows as clear, and to dull the glass as little as the explanation or expression of the subject will admit of. Two or three or more firings are necessary during the process of this painting. This being done, the glass goes back to the glazier's bench again, and he leads it up, and the window, after having been solidified by a stiff cement or putty rubbed into the leaf of the leads, has then only to be put in its place and strengthened by the due iron stay bars.

Of the origin of glass manufacture nothing is known, but according to Egyptologists, the Egyptians made sham jewels of glass at least 5000 or 6000 B. C. In some of the most ancient tombs scarabs of glass have been found imitating rubies, emeralds, sapphires, and other precious stones. It is probable that the great center of the glass industry of mediæval and more recent times, Venice, received its early impulse and lessons from Constantinople. The art began there with the beginning of the city in the 7th century A. D., and there was a marked improvement after the conquest of Constantinople in 1204, and in 1291 the establishments were removed to the island of Murano, the manufacturers forming a guild with a register of nobility and guarding their secret with the greatest jealousy. In 1436 their color glass came into note, and continued so till the close of the century; and in the 16th century lace patterns and mirrors were introduced. In the 15th and 16th centuries plain glass with tasteful ornaments in gilt and enamel; in the 16th, crackled lace and reticulated glass; and in the 17th century, variegated or marbled glasses were produced.

The Venetian glass enjoyed for a long time the monopoly of commerce, and within recent years there has been a marked revival of the skill and enterprise of Venetian craftsmen. In Germany the oldest glass dates from the

16th century, and consists of goblets and tankards of white color, enameled with colored coats of arms and other devices, millefiori, and schmeltz glass. Engraved glass was first introduced by Casper Lehmann, at Prague, in 1609, under imperial protection, and continued by his pupil Schwanhard; and ruby glass by Kunckel in 1679. Glass is said to have been made in 1294 at Quinquengrone, in Normandy, and a common kind was made later in Dauphiné and Provence. In 1665 20 Venetian glass workers were brought by Colbert to Paris, where they set up the blowing of glass and the silvering of mirrors, the famous mirror hall in Versailles having been furnished by them. In 1688 an exclusive privilege of making large plates of glass by casting was conferred on Abraham Thevart. The name Thevart was assumed by a syndicate of capitalists formed to develop and work the invention of Louis Lucas de Nehon, who was the real inventor of plate glass and the founder of the Gobain works, one of the most extensive plate glass works in the world. In France oxide of lead flint glass was made at St. Cloud in 1784; another manufactory was subsequently established at St. Louis in 1790; and the St. Cloud establishment was removed to the vicinity of Mont Cenis, where it flourished till 1827.

It is uncertain whether glass was made in England before the 16th century, as that mentioned may have been imported from Flanders or Venice. In 644 Benedict Biscop introduced makers of glass windows into Northumbria; but window glass was not in general use for windows till the 15th century. Attempts were made to establish glass works at Jamestown, Va., in 1608-1622; at Salem, Mass., in 1639-1640; in New York City before 1664; and in Pennsylvania before 1683. Subsequently works were established in 1780 at Temple, N. H.; in 1792 at Boston; and in 1797 at Pittsburgh. Plate glass was first made there in 1853, and it is also made at Baltimore and New York. Pressed glass was invented in the United States.

GLASSITES, a religious sect, which sprang up in Scotland about 1729, and was so called after its founder, the Rev. John Glas, who was originally a minister of the Church of Scotland, but was deposed by the General Assembly. He was opposed to all national establishments for the support of religion, and advocated a system of independent Church government. One of his principal disciples was Robert Sandeman, who formed a congregation in London in 1762. This sect in England bears the name of Sandemanians. The leading tenets of the Glassites, or Sandemanians, relate to the efficacy of the atonement and the nature of faith. They hold that "the bare death of Christ, without a deed or thought on the part of man, is sufficient to present the chief of sinners spotless before God"; and that "faith is no more than a simple assent to the divine testimony, passively received by the understanding." They observe certain peculiar practices, supposed to have been prevalent among the primitive Christians; such as weekly sacraments, love-feasts, washing each other's feet, the kiss of charity, etc.

GLASS MOSAIC, an imitation of antique mosaic work, formed of small cubes of glass mixed with various coloring matters, chiefly metallic oxides, so as to form opaque colored enamels, which are cast into slabs or flat cakes, the slab being afterward cut into very small cubes or rectangular pieces. With these little colored cubes a picture is built up by inserting each one separately in a bed of cement.

GLASSPORT, a borough of Pennsylvania, in Allegheny co. It is on the Pittsburgh and Lake Erie Railroad, and on the Monongahela river. It is the center of an important coal-mining region, and its industries include the manufacture of axes, steel hoops, glass, foundry products, etc. Pop. (1910) 5,540; (1920) 6,959.

GLASSPOT, the pot in which the frit is fused into glass. They are made of pure refractory clay, mixed with about one-fifth its weight of old pots pulverized by grinding, are built up instead of being formed on a mold, and baked by being subjected to a white heat.

GLASS ROPE, a genus of siliceous sponges, consisting of a cup-shaped body affixed to a muddy part of the sea bottom by means of a rope of long twisted siliceous fibers.

GLASS SNAKE, a lizard, of the family *Zonuridæ*, or *Chalcidæ*. From the absence of feet, they look like serpents. They are found in this country. The name glass snake is supposed to allude to the brittleness of their tail.

GLASTONBURY, a town of Somersetshire, England, 25 miles S. of Bath. It was the seat of the most magnificent and wealthy abbey in England, the last abbot of which was hanged for refusing to surrender it to Henry VIII. Its ruins are still extensive.

GLATZ (gläts), a town of the province of Silesia, Prussia, on the left bank of the Neisse, 52 miles S. S. W. of Breslau. It has four Catholic churches. Its manufactures before the World War included

linen, damask, and woolen fabrics, leather, and rose-garlands. During the Thirty Years' and Seven Years' Wars, Glatz was frequently besieged and taken. Pop. about 17,000.

GLAUBER'S SALT, sulphate of sodium, so called because of the importance attached to its chemical and medicinal properties by Glauber.

GLAUCHAU, a manufacturing town in Saxony, Germany, situated on the Mulde, eight miles northwest of Zwickau. Prior to the World War it ranked as one of the chief textile manufacturing centers of all Germany, especially in the production of high class woolen fabrics. The local museum has a very complete collection of old textiles, and one of the best technical textile schools in Germany is located here. Included in the town's industrial establishments were twenty-four dye factories. The population is about 25,000.

GLAUCINE, the alkaloid contained in the leaves of *Glaucium flavum*. The leaves are macerated with acetic acid, then the juice is pressed out, boiled, filtered, and the filtrate treated with lead nitrate, which precipitates lead fumarate. The filtrate is treated with H_2S, then the glaucine is precipitated with tannin, and the precipitate decomposed by chalk.

GLAUCODOTE, an orthorhombic, greenish, tin-white mineral of metallic luster and white streak. It occurs in chlorite slate in the province of Huasco in Chile, also in Sweden.

GLAUCOMA (glâ'kō-ma), an opacity of the vitreous humor of the eye, characterized by a bluish tint seen from without, and the absence of the peculiar characters of the cataract, which, in some respects, it resembles.

GLAUCONITE, an amorphous green opaque mineral, like earthy chlorite, with a dull or glistening luster. There are two varieties of it; the one the green earth cavities in eruptive rocks, the other the green grains in greens and formation, or anything similar.

GLAUCOPICRINE (-pī'krin), an alkaloid occurring in the root of *Glaucium flavum*. The root is exhausted with acetic acid, then precipitated with ammonia, redissolved in acetic acid, then precipitated with a solution of oak bark, and decomposing the precipitate with chalk, is crystallized out of ether.

GLAUCOPINÆ (-pī'nē), wattle-crows, a sub-family of *Corvidæ*. The bill is short; the culmen elevated and curved from the base; the upper mandible entire; the wings short, rounded; the tail lengthened, graduated, or cuneated.

GLAUX, a genus of plants, order *Primulaceæ*, having a five-lobed calyx, no corolla, and a five-valved capsule, with about five seeds. *G. maritima*, sometimes called sea milk-wort and black salt-wort, is one of the most common plants of our sea-coasts, growing in almost every muddy situation. It is a small plant, with branching stems, often procumbent, and small fleshy leaves. It makes a good pickle.

GLAZE, a vitrifiable composition for covering earthenware or porcelain. In cookery the word is applied to the white of eggs, or strong gravy or jelly boiled down to the consistency of a thin cream, and used to cover pastry, with a glossy, shining coating. In painting it is used for any kind of varnish intended to preserve the picture from the effects of the atmosphere, and to add brilliancy to the colors.

GLAZIER, LAKE, a body of water in Minnesota, S. of Lake Itasca, into which it empties through a swift and permanent stream about six feet wide; named for Capt. Willard Glazier, who claimed for it a geographical importance as the true source of the Mississippi. Lake Glazier is in lat. about 47° 34′ N. and lon. 95° .02′ W.; is 1½ miles in greatest diameter; and has an area of 255 acres. It is estimated to be 1,582 feet above the Atlantic, and 3,184 miles from the Gulf of Mexico. The Minnesota State Historical Society sent an expedition to the region and published a refutation of Glazier's claims.

GLEASON, ELLIOTT PERRY, an American inventor; born in Westmoreland, N. H., June 27, 1821; received a common school education; was one of the first to manufacture gas burners; and invented the regulating argand burner, etc. He died in 1901.

GLEAVES, ALBERT, an American naval officer, born in Nashville, Tenn., in 1858. He studied at the United States Academy and was appointed ensign in 1881. He rose through the various grades, becoming captain in 1909, rear admiral in 1915, vice-admiral in 1918, and admiral in 1919. He saw much service, both on shore and at sea. In 1915 he was appointed commander of the destroyer "Force" of the Atlantic Fleet and in May, 1917, he was appointed commander of convoy operations in the Atlantic. In this capacity he convoyed the first American Expeditionary Force to France. He was commander of the cruiser and transport force of the Atlantic Fleet from July, 1917, to September, 1919. In the latter year he was made a commander of the Asiatic Sta-

tion. While on special service in command of the Dolphin, he discovered the greatest depth in the North Atlantic Ocean. In 1908 he established the first government torpedo factory. He was awarded the Victory medal with star, and the Distinguished Service Medal, and was commander of the French Legion of Honor. He was the author of "Captain James Lawrence, U. S. N." (1904).

GLEBÆ ADSCRIPTI (glē'bē ad-skrip'tī), in the Roman empire, from the 4th century onward, the cultivators of the soil, who, though personally free, were inseparably attached to the land they cultivated. They paid a fixed rent in kind to the owner of the domain, and, when he retained any land in his own hands, they were generally under the obligation to render him free a determinate amount of labor to till it. If the land was sold, they still remained attached to it. The Helots of Sparta were also *glebæ adscripti.*

GLEBE, in the established Churches of England and Scotland, the land possessed as part of the revenue of an ecclesiastical benefice, usually along with a dwelling house.

GLEDITSCHIA, a genus of plants, order *Fabaceæ.* They are trees, with supra-axillary, branched spines; leaves abruptly pinnate and bi-pinnate, often in the same specimen. G. *triacanthus*, the honey locust, is a fine ornamental tree, native from Pennsylvania to Missouri, and now common in cultivation. Its branches are armed with stout, triple spines. In favorable circumstances it attains the height of 70 feet. The thorns, with which its branches are armed in a most formidable manner, are 2 to 3 inches long. Foliage light and elegant, the flowers are small, white, succeeded by flat, crooked hanging pods. Seeds flat, hard, brown, imbedded in a fleshy substance; at first sweet, but becomes sour.

GLEE, a musical composition for voices in harmony, consisting of two or more contrasted movements, with the parts so contrived that they may be termed a series of interwoven melodies. It may be written for three or more voices, either equal or mixed; but it is necessary that there should be only one voice to a part. It may be designed with or without instrumental accompaniment, and set to words in any style. As a composition the glee appears to have historically followed the catch.

GLEEMEN, itinerant minstrels, so called by the Anglo-Saxons; by the Latin writers of the Middle Ages they are termed joculatores. The name appears to have been supplanted by the Norman minstrels shortly after the Conquest.

GLENALMOND (-ä'mond), a valley of Perthshire, Scotland, much visited for its scenery, and for Ossian's grave—the subject of Wordsworth's verses on the "Narrow Glen." It is the seat of Trinity College, Glenalmond (1847), whose buildings have been to some extent reproduced in those of Trinity College, Hartford, Conn.

GLENCOE (-kō), a valley in the county of Argyle, near the head of Loch Etive, Scotland. It is bounded on both sides by almost perpendicular mountains over 3,000 feet high. The valley was the scene of a tragedy known as the massacre of Glencoe. The state of the Highlands after 1690 was a subject of great anxiety to the government. Although the Highlanders had ceased any important operations since the death of Dundee at Killiecrankie, they had not laid down their arms. In 1691 a proclamation was issued promising pardon to all who should swear allegiance on or before Dec. 31, 1691. All the chiefs, with the exception of one Ian of Glencoe, complied. The latter had unfortunately exceeded the prescribed period, and a certificate which he produced to prove that he had offered to take the oaths at Fort William was suppressed, as is thought by Stair. The king's signature was obtained to an order to extirpate the MacDonalds. On Feb. 1 a party of soldiers, 120 in number, commanded by Captain Campbell of Glenlyon, marched up the glen and took quarters as friends. The soldiers belonged mostly to the clan Campbell, enemies of the MacDonalds, but they were well treated, and all went merrily for 12 days. At 5 in the morning of the 13th Glenlyon and his men suddenly fell on the MacDonalds. Thirty-eight men were murdered, but many who had escaped perished in the snow, sank into bogs, or died for lack of food.

GLEN COVE, a city in Nassau county, New York. It is on the Long Island Railroad, and on Long Island Sound. It is chiefly a residential city, but has some manufactures. It has excellent public schools and a public library. It is the seat of a Friends' Academy. It was incorporated in 1918. Pop. (1920) 8,664.

GLENDALE, a city of California, in Los Angeles co. It is on the Pacific Electric and the San Pedro, Los Angeles, and Salt Lake railroads. Its public institutions include a sanitarium, a public library, and a high school. It is the center of an important fruit-growing district. Pop. (1910) 2,746; (1920) 13,536.

GLENDALOUGH (glen-dal'o), in Leister, Wicklow co., Ireland, about 24 miles S. of Dublin; the vicinity is celebrated for its scenery and ruins.

GLENDOWER, or **GLENDWR, OWEN** (glen'dör), a Welsh chief; born in Montgomeryshire about 1359. He was made esquire of the body to Richard II., and remained with him till his deposition by Henry IV. in 1399, after which he retired into private life. Shortly after the accession of the new king part of Glendower's lands were seized by his neighbor, Lord Grey of Ruthin. Thereupon the Welshman, being unable to obtain redress from the English king, took up arms in his own cause, and in 1400 commenced operations by seizing the estates of Lord Grey. The king ordered his subjugation, and granted his estates to his brother, the Earl of Somerset. Then for two years Glendower carried on a guerrilla warfare against the English marches. In 1402 he drew Lord Grey into an ambush, and took him prisoner. In this same year Sir Edmund Mortimer, the uncle of the Earl of March, was also captured by Glendower. Both Grey and Mortimer married daughters of the Welsh chieftain and with him formed the coalition with Harry Percy (Hotspur) against Henry of England. That coalition ended in the battle of Shrewsbury in July, 1403, in which the English king gained a decisive victory, Hotspur being among the slain. In June of the following year Glendower entered into a treaty with Charles VI. of France, who in 1405 sent a force to Wales to act against the English. Meantime, in the spring of 1405, Glendower had been twice severely defeated by Prince Henry of England. The Welsh prince nevertheless kept up a desultory warfare during the remaining years of his life. He never submitted to English rule, and is believed to have died peacefully in Monmouthshire after 1416.

GLENFINNAN, a Highland glen in Inverness-shire, Scotland; 18 miles W. of Fort William. Here, on Aug. 19, 1745, the clans gathered under Prince Charles Edward's banner, and here in 1815 was erected to his memory a tower bearing an inscription in Gaelic, Latin, and English.

GLENLIVET (-lē'vet), the valley of Livet Water in Banffshire, Scotland. The Livet runs 14 miles N. W. till, at a point 5 miles S. of Ballindalloch station, it falls after a total descent of 1,600 feet into the Avan, itself an affluent of the Spey. In the battle of Glenlivet or Alltacoileachan, Oct. 4, 1594, 10,000 Protestants under the Earl of Argyll were routed by the Catholic insurgents under the Earl of Huntly.

GLENNON, JAMES HENRY, an American naval officer, born in French Gulch, Cal., in 1857. He graduated from the United States Naval Academy in 1878. He was appointed ensign in 1882. He rose through the various grades, becoming captain in 1909, and rear-admiral in 1916. During the Spanish-American War he served on the "Massachusetts," and was acting captain of the port of Havana in 1899. He commanded at various times the Navy Yard of New York, and other navy yards, and was a member of the Panama Fortifications Board. He was also president of the Board of Naval Ordnance and the Joint Army and Navy Board on gun forgings, in 1915. He was commander of the Navy Yard and superintendent of the Naval Gun Factory at Washington in 1915-1917. In the latter year he was a representative of the Navy Department with the American special mission to Russia. He was commander of Squadron One, of the Battleship Force of the Atlantic Fleet, in September, 1917, and was commander of the 5th Division of the Atlantic Fleet in 1918. In 1918-1919 he was commandant of the 13th Naval District.

GLENNON, JOHN JOSEPH, an American Roman Catholic archbishop, born in Kinnegad, County Meath, Ireland, in 1862. He graduated from All Hallows College, Dublin, in 1883, and in the following year was ordained priest. He removed to the United States and became assistant pastor of St. Patrick's Church in Kansas City. He was successively pastor of the cathedral in Kansas City, vicar-general of the diocese, administrator of the diocese, and coadjutor-bishop of Kansas City. He was consecrated bishop of Pinara in 1896, and became coadjutor archbishop of St. Louis in 1903. In the same year he was created archbishop of St. Louis.

GLENROY (-roi'), a valley in the Highlands of Scotland, paralled to Glenmore in Lochaber, Inverness-shire. It is nearly 14 miles in length, and little more than ½ mile in breadth, and is celebrated for its so-called Parallel Roads which are three parallel terraces running along either side of the glen. Not only do the lines on the same side run parallel to each other, but on both sides they respectively occupy the same horizontal level. These terraces project, at some parts only a few feet from the hillside, and at others widen out so as to be a number of yards in breadth. The lowest terrace is 850 to 862 feet above the sea-level; the

middle, 1,062 to 1,077 feet; and the highest 1,144 to 1,155 feet. Their origin was much disputed, but according to Macculloch, Agassiz, Buckland, and Geikie, the roads are shore-lines of glacier lakes.

GLENS FALLS, a village in Warren co., N. Y., on the Hudson river, and on the Delaware and Hudson railroad; 54 miles N. of Albany. The river, here flowing through a ravine, descends 50 feet over a precipice 900 feet long, from which the place derives its name, and supplies enormous water power. The city has extensive marble and limestone quarries, lime works, sawmills, shirt, paper, and collar factories, and lath and planing mills. There are a Union High School, Crandell Public Library, a summer school for teachers, Glens Falls Academy, electric lights and street railroads, waterworks, daily and weekly newspapers, and National banks. Pop. (1910) 15,243; (1920) 16,638.

GLENTILT, a valley in Perthshire, Scotland; the deep narrow glen of the Tilt, which issues from Loch Tilt and runs 16 miles S. W. receiving the larger Tarf Water and Fender Burn, until at Blair-Athole it falls into the Garry. Glentilt is classic ground to the geologist, as having furnished evidence for the Huttonian or denudation theory.

GLINKA, GREGORY ANDRÉEVICH, a Russian author; born near Smolensk in 1774. He was in boyhood a page at the imperial court. He entered upon a distinguished career as an educator, and accompanied Alexander I.'s brothers on their Continental tour in 1811. His works include: "The Ancient Religion of the Slavs"; "Miscellanies in Prose and Verse" and a play, "The Daughters of Love." He died in Moscow in 1818.

GLINKA, MICHAEL IVANOVITCH, a Russian composer; born in Smolensk, May 20, 1804; studied under John Field in St. Petersburg. Several songs and the operas "Life for the Czar" and "Russian and Ludmilla," all in Russian, have received high praise from critics. He died in Berlin, Feb. 15, 1857.

GLINKA, SERGIUS NICOLAIEVICH, a Russian poet; born in Smolensk in 1774. He entered the military service and rose to the rank of major, when he retired. His literary work was devoted mainly to the young and their training. "Readings for Children," "History of Russia for the Use of Boys and Girls," and similar books, are highly esteemed. He also composed a few plays in verse, edited the "Russian Messenger," and translated Young's "Night Thoughts." He died in Moscow in 1847.

GLISSON'S CAPSULE, in anatomy, a sheath of areolar tissue surrounding the branches of the portal vein, the hepatic artery and the hepatic duct; first pointed out by Glisson.

GLOBE, a city of Arizona, the county-seat of Gila co. It is on the Arizona Eastern railroad. In the neighborhood is the great Roosevelt reservoir, which was erected at a cost of over $8,000,000. It has a park, a library, and other public buildings. It is the center of an important mining region and its chief industry is the smelting of copper. Pop. (1910) 7,083; (1920) 7,044.

GLOBE, a sphere, round solid body, which may be conceived to be generated by the revolution of a semicircle about its diameter. An artificial globe in geography and astronomy, is a globe of metal, plaster, paper, pasteboard, etc., on the surface of which is drawn a map, or representation of either the earth or the heavens, with the several circles which are conceived upon them, the former being called the terrestrial globe, and the latter the celestial globe. In the terrestrial globe the wire on which it turns represents the earth's axis, the extremities of it representing the poles. The brazen meridian is a vertical circle in which the artificial globe turns, divided into 360 degrees, each degree being divided into minutes and seconds. The brass meridian receives the ends of the axis on which the globe revolves. At right angles to this, and consequently horizontal, is a broad ring of wood or brass representing the horizon; that is, the true horizon of the earth which lies in a plane containing the earth's center.

GLOBE FISHES, the family *Gymnodontidæ*, of which the chief genera are *Diodon* and *Tetraodon*. They are so called because by taking air into a large sac, extending over the whole of the abdomen beneath the skin, they became nearly globular as a result of this inflation.

GLOBIGERINA (-ī'nā) **MUD**, in geology, a light-colored calcareous mud in places in the Atlantic 3,000 fathoms deep, and abounding in *Globigerinæ*, rich in siliceous sponges, and often supporting a varied fauna of *Mollusca*, *Crustacea*, and *Echinoderms*.

GLOBULIN, crystallin, or vitellin, an albuminous substance first obtained from the crystalline lens of the eye. Globulin thus obtained is a yellowish transparent mass, which swells up and dissolves in water; the solution becomes opaline at 73° and coagulates at 93°. It can be obtained by treating the yolks of eggs with ether, and treating the residue with

chloride of sodium solution and precipitating with water.

GLOCKERITE, a brown, ocher-yellow, brownish-black, pitch-black, or dull-green mineral; massive, sparry, or earthy and stalactitic. Found in Hanover; also at Modum, in Norway.

GLOCKNER, a mountain in Austria belonging to the Noric Alps, on the frontiers of the Tyrol, Carinthia, and Salzburg. It is 12,350 feet in height, and takes its name from the resemblance of the principal summit to a large bell.

GLOGAU, or **GROSSGLOGAU**, the capital of a district in Prussian Silesia, Germany, situated on the Oder, 60 miles northwest of Breslau, on the Oder river. Here is located a second class fortress, built on an island in the river.

GLOMMEN, the largest river in Norway, issuing from Lake Aursund, at 2,339 feet above sea-level, and winding 350 miles to the Skager Rack at Frederikstad. Its course is interrupted by frequent waterfalls, the last, with a descent of 74 feet, being the Sarpsfos, 7 miles from the mouth. It is only navigable a few miles above and below Sarpsfos. Its most important affluent is the Vormen from Lake Mjösen.

GLORY PEA, a leguminous plant, native of the desert regions of Australia. It is a low straggling shrub with light-colored, hairy, pinnate leaves, and large, brilliant scarlet flowers, the standard or banner petal of which appears in the form of an elongated shield with a dark brown boss in the center.

GLOSS, the name is given to the interpretations or explanations of the Justinian code, which were generally written between the lines of the text and on the margin, and were hence called "glossæ interlineares" and "glossæ marginales." These glosses were sometimes held to be of equal authority with the text itself. Accursius, who died about 1260, collected and arranged the glosses of his predecessors. The practice of introducing glosses was also adopted with the books of the canon law.

GLOSSANTHRAX (-an'-), a disease affecting herbivorous animals, especially cattle and horses. It is characterized by dark-colored carbuncles on the tongue.

GLOSSARY, a vocabulary or dictionary of glosses, or explanations of words obsolete or rare, or occurring only in works of a special class as technical terms, or of provincial dialectal forms of words.

GLOSSITIS (-sī-tis), inflammation of the tongue. When it occurs, it is generally as a symptom of some other disease. The tongue when inflamed often becomes too large for the mouth.

GLOTTIS, the mouth of the wind-pipe. It constitutes a narrow aperture covered by the epiglottis when one holds his breath or swallows. It contributes by dilatation and contraction to the modulation of the voice. It is sometimes called the rima glottis.

GLOUCESTER (glos'ter), a city and parliamentary borough, river port and county-seat of Gloucester co., England; on the left bank of the Severn, here divided into two channels inclosing the Isle of Alney and crossed by two fine bridges, 95 miles N. W. of London. It carries on a considerable shipping trade, the Gloucester and Berkeley canal giving access to the docks. The most remarkable public edifice is the cathedral; it was originally the church of a Benedictine abbey, dating from 1058, and was converted into a cathedral at the Reformation. It exhibits a great variety of styles, the choir, with its roof of fan tracery being a fine example of Perpendicular Gothic. Other buildings are several handsome old churches, the shire hall, the guildhall, the bishop's palace, and county schools of art and science. The schools include the collegiate school founded by Henry VIII., the theological college, the blue-coat school founded in 1666, now known as Sir Thomas Rich's school, and the grammar school of St. Mary de Crypt, founded in the time of Henry VII. Pop. (1919) 50,000.

GLOUCESTER, a city and port of entry of Essex co., Mass., and Massachusetts Bay, near the extremity of Cape Ann, and on the Boston and Maine railroad; 32 miles N. E. of Boston. It is one of the most important fishing ports and fish markets in the world, having over 5,000 men engaged in the fisheries. Cod, haddock, halibut, herring, and mackerel are the principal catches. The Cape Ann granite quarries employ nearly 2,000 men, and supplied the granite for the postoffices at Boston and Baltimore and the East River bridge. The city is a popular summer resort, and has considerable historical interest. It was founded in 1623, principally by settlers from Gloucester, England, from which it received its name; was incorporated as a town in 1642; and became a city in 1874. It has the oldest Universalist Church in the United States, founded in 1770. There are the Sawyer Public Library, electric lights and street railroads, the Gilbert Hospital, Gilbert Home, Huntress Home for Aged Women, high school, daily and weekly newspapers, waterworks, and 2

National banks. Pop. (1910) 24,394; (1920) 22,947.

GLOUCESTER CITY, a city in Camden co., N. J.; on the Delaware river and on the Atlantic City and Pennsylvania railroad; 3 miles S. of Camden. It has steam ferry connections with Philadelphia, and has electric lights and street railroads, waterworks, cotton mills, iron, terra cotta, and print works, the Welsbach gas mantle factory, and valuable fishing interests. There are weekly newspapers, and savings banks. Pop. (1910) 9,462; (1920) 12,162.

GLOUCESTERSHIRE, a county of England, in the southwest part. It has an area of 1,259 square miles. Its chief industries are dairying and the raising of cattle. It has also extensive manufacturing interests and some coal mining. It contains the parliamentary boroughs of Cheltenham and Gloucester, and a part of the borough of Bristol. The capital is Gloucester. Pop. of the county, about 740,000.

GLOUCESTER, DUKES AND EARLS OF. (1) ROBERT, Earl of Gloucester (died 1147), a natural son of Henry I., the principal supporter of his sister Matilda and her son Henry in their contest against Stephen for the English throne. (2) GILBERT DE CLARE, Earl of Gloucester (1243-1295), one of the most influential nobles during the reigns of Henry III. and Edward I. At first he sided with Simon de Montfort, and helped him to gain the battle of Lewes (1264); but afterward, quarrelling with Simon, he made common cause with Prince Edward and won for him the battle of Evesham (1265). (3) THOMAS OF WOODSTOCK, Duke of Gloucester (1355-1397), the youngest son of Edward III., was from 1386 to 1389 the virtual ruler of the country. He was put to death by Richard II. at Calais in 1397, on the plea that he was plotting against the king. (4) HUMPHREY, Duke of Gloucester (1391-1447), fourth son of Henry IV., acted as protector of the realm during the minority of Henry VI. He was arrested for high treason on Feb. 18, 1447, and five days later found dead in bed. He was a patron of learning, but reckless and foolish in his public conduct. (5) RICHARD, Duke of Gloucester, became KING RICHARD III. (*q. v.*). (6) HENRY Duke of Gloucester (1639-1660), third son of Charles I. (7) WILLIAM, Duke of Gloucester (1689-1700), eldest son of Queen Anne. (8) WILLIAM HENRY (1743-1805), George III.'s brother, created Duke of Gloucester and Edinburgh in 1764. (9) His son, WILLIAM FREDERICK (1776-1834).

GLOVE, an article of dress; a covering for the hand. Its use reaches back to a remote antiquity, for we are told in the Odyssey that Laertes, the farmer-king, wore gloves to protect his hands from the thorns. Xenophon also sneers at the Persians for wearing gloves for keeping their hands warm. In their more robust days the Greeks and Romans scorned the use of gloves; but in later times they were used in Rome. The glove appears to have become a well-known article of dress in England about the 14th century, and corporations of glovers were in existence in the 15th century.

Modern gloves are of two distinct classes, woven and knitted gloves, and those made of leather; and the making of these constitute entirely separate branches of manufacture. The manufacture of knitted or woven gloves is an industry allied to the hosiery trade, and the materials comprise all the ordinary fibers, the most important being silk and wool. In some cases these gloves are entirely made and finished by knitting; but in others the pieces are separately fashioned and sewed together as in making leather gloves. The manufacture is widespread, but the headquarters of the thread and cloth glove trade are now Berlin and Saxony. The materials used for making leather gloves is principally the skins of deer, sheep and lambs, goats and kids, the latter being the most important, though far more "kid" gloves are made of sheep than of kid leather. The skins for military and other heavy gloves—doe or buck leather—are prepared by the ordinary process of tanning.

Kid gloves are of two principal kinds, glacé and suède, according to the manner of dressing and finishing the leather used. Glacé gloves are those which are dressed, dyed, and polished on the hair or outer side of the skin, while suède gloves are carefully pared, smoothed, and dyed on the inner side of the skin for their purpose, and thus have the appearance of fine chamois. Paris and Grenoble are the chief seats of the French kid glove trade. Military gloves are made at Niort and Vendôme. Brussels and Copenhagen are also important glove-making centers. In England, Worcester is the principal seat of the glove industry; and in a specialty, the so-called English dogskin gloves made from the skins of Cape sheep, the English manufacturers are without rivals. In feudal times the challenge to single combat was given by the casting down of the glove; and an ancient and more pleasing ceremonial still observed consists in the presentation of white gloves to a judge presiding over an assize at which no cases come up for trial.

GLOVERSVILLE, a city in Fulton co., N. Y.; on the Fonda, Johnstown and Gloversville railroad, and on the Erie canal; 50 miles N. W. of Albany. It is celebrated for its manufacture of gloves. It contains the Nathan Littauer Hospital, the Parsons Free Library, a high school, business college, a National bank, waterworks, electric lights and railroads, and daily and weekly newspapers. Pop. (1910) 20,642; (1920) 22,075.

GLOW WORM, a beetle of which the male flies and does not shine, while the female shines and does not fly. It is from the latter sex, therefore, that the name glow worm has been derived. The phosphoric light is displayed at the tail of the insect.

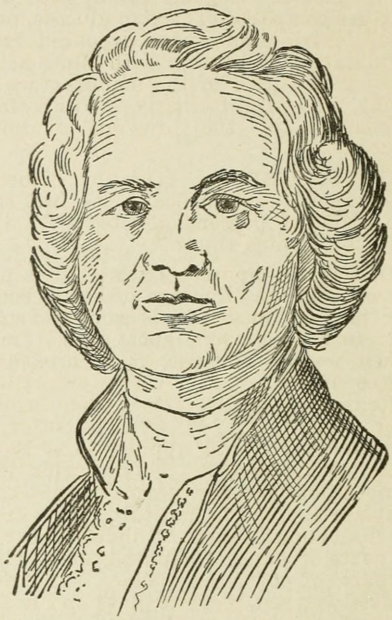
GLOXINIA, a genus of plants, order *Gesneraceæ*. Some of the species are among the more popular flowers, and are well known to gardeners by their foxglove-shaped flowers of varied colors, each standing on a separate stalk—in some forms with the opening of the tube directed downward; in others standing erect. The gloxinia generate buds from fragments of their leaves, under the hands of the cultivator.

GLUCHOV (glö-kov'), a town in the government of Tchernigoff, Russia; 112 miles E. of Tchernigoff. It has manufactures of soap, candles, and leather, and a considerable trade in grain. In the vicinity is the chief source for porcelain clay in the empire. Pop. about 15,000.

GLUCINUM (-sī'num), an elementary metal, the base of the earth glucina. It resembles aluminum, and is prepared in the same manner. It is not acted on by water, fuses with difficulty, and when heated in the air, burns, producing glucina. It was discovered by Wöhler in 1828.

GLUCK, ALMA, a soprano singer, born in Bucharest, Rumania, in 1886. At the age of three she was brought to the United States, where she was educated in the public schools and at Normal College of New York. She studied music in that city, and made her first appearance in 1909 in opera. She at once gained recognition as an artist of unusual talent, both in opera and on the concert stage. In 1914 she married Efrem Zimbalist, violinist.

GLUCK, CHRISTOPH WILLIBALD (glök), a German composer; born in Weidenwang, July 2, 1714; studied music at Milan, under San Martini, and presented soon afterward several operas in theaters in Italy. Judging that his want of success was partially due to the weakness of the libretti, he conjoined with himself in his labors the poet Ranieri di Calzabigi, and his next subsequent opera, "Helena and Paris," was received with tumults of applause. In 1774 he went to Paris, and presented there successively



CHRISTOPH WILLIBALD GLUCK

several masterpieces, as "Iphigenia in Aulis," "Orpheus," "Armidas," "Iphigenia in Taurus," "Alcestes." He died in Vienna, Nov. 15, 1787.

GLUCKSTADT (glük'stät), a town in the province of Schleswig-Holstein, Prussia, on the Elbe river, 32 miles N. W. of Hamburg. Founded in 1616 by Christian IV. of Denmark, it is a pretty town, regularly built, and intersected by canals, its chief building the Rathaus (1642; restored 1874). During the Thirty Years' War Glückstadt successfully withstood three sieges; its fortifications were demolished in 1815.

GLUCOSE, a fermentable sugar, $C_6H_{12}O_6$, which occurs in two modifications, called dextro-glucose, or dextrose, and lœvo-glucose (also called Levulose), according as it turns the plane of polarization to the right or left. A solution of cane-sugar warmed with dilute acids, or left in contact with yeast, is converted into dextrose and levulose, $C_{12}H_{22}O_{11}+H_2O=C_6H_{12}O_6+C_6H_{12}O_6$. These modifications can be separated, thus—10 parts of the mixture of sugar are dissolved in 100

parts of water, and cooled with ice; then six parts of powdered calcium hydrate are added, the calcium compound of levulose is precipitated and separated from the soluble calcium compound of dextrose by strong pressure, washed, and decomposed by carbonic-acid gas. The term "glucose" is generally applied to a mixture composed of dextro-glucose, maltose, dextrin and water prepared from corn starch, by heating with dilute acids. It is widely used in the manufacture of candy, and was formerly an important commodity in the brewing of malt liquors.

GLUCOSURIA, a form of diabetes. The name has reference to the fact that the urine of persons affected with this disease contains sugar.

GLUE, an impure gelatine. It is prepared from the clippings of hides, hoofs, and horns. Good glue is semi-transparent, and free from spots and clouds. When wanted for use, it is broken in pieces and steeped in cold water till it softens and swells. It is then melted over a gentle fire, or, what is better, in a water bath, and applied in a liquid state with a brush. Marine glue is a composition used for cementing materials that are exposed to moisture. It is made by dissolving 1 part of india-rubber in 12 parts of mineral naphtha, and adding 20 parts of powdered shellac. It not only resists wet, but cements glass and metals as well as wood. White fish-glue, or diamond cement, is made of isinglass dissolved in alcohol.

GLUME, or **GLUMA**, the exterior series of scales constituting the flower of a grass. It consists of empty bracts. The name was given by Linnæus and adopted by Lindley.

GLUMELLA, a name given by De Candolle and Desvaux to two bracts within the glumes of a grass; the other name being pale. In one of the bracts the midrib quits the blade a little below the apex, and is elongated into an awn, arista, or beard, while the other bract which faces the fruit has its back to the rachis, is bifid at the apex, has no dorsal veins, and has a rib on each side of its inflexed edges. These two bracts are called by Linnæus the corolla of the grass, by Jussieu the calyx, by Robert Brown the perianth, and by Lindley and others its paleæ.

GLUTAMIC ACID, an acid obtained by boiling vegetable gluten with dilute sulphuric acid, or casein with hydrochloric acid and stannous chloride.

GLUTEN, an albuminous substance, obtained by mixing 10 parts of wheat-meal with 8 parts of water, and allowing it to stand for half an hour; it is then washed with water, and kneaded, till all the starch is washed away, and the gluten thus obtained is a tenacious, yellowish-gray, elastic mass, which dries into a horny, semi-transparent mass, resembling glue.

GLUTEUS, or **GLUTÆUS**, three muscles of the hip, the *G. maximus*, the *G. medius*, and the *G. minimus*. The first is a very large and coarsely fasciculated muscle, which makes the buttock prominent in man; its use is to extend the thigh. The second is smaller; it is partly covered by the muscle already mentioned, and acts when one stands. The third is the smallest; it is covered by the second one, and acts as an abductor of the thigh.

GLUTIN, or **GLUTINE**, vegetable gelatine. It is obtained along with mucin by heating gluten in small fragments, with alcohol of 80 per cent., and then with alcohol of 70 per cent.; the alcoholic solutions are united, and the half of the alcohol distilled off. On cooling it deposits a mixture of glutin and mucin. The deposit is dissolved in 50 per cent. alcohol, and filtered through calico while hot, and then agitated till it is cold; most of the mucin is precipitated, the filtered liquid is evaporated in a water bath, and the glutin dissolved in alcohol.

GLUTTON, in zoölogy, the popular name for the wolverine, a carnivorous mammal of the family *Melidæ* (badgers). Its length is from two to three feet. It occurs in high latitudes in Europe, Asia, and North America. Its motions are slow, but it manages to feed on mice, marmots, and other rodents, and, when it can obtain them, on larger quadrupeds, alive or dead. Its fur is of little value.

GLYCERALS, in chemistry, compounds analogous to acetals, obtained by heating glycerin with aldehydes for 30 hours at a temperature of 170° to 180°; as acetoglycerale, $C_5H_{10}O_3$. It boils at 184°.

GLYCERAMIC ACID, in chemistry, serin. $C_3H_7NO_3$ or $C_2H_3(OH)\cdot NH_2CO\cdot OH$, a monobasic, triatomic, amido-acid, obtained by boiling silk with water and evaporating the filtered solution, adding a quarter of its volume of sulphuric acid, and boiling for 24 hours; then it is neutralized with excess of calcium hydrate, the filtrate is evaporated and a little H_2SO_4 added to neutralize it. Tyrosin and calcium sulphate first separate out on evaporation, then serin, and lastly a little leucin. The serin is dissolved in 40 parts of cold water, filtered, the filtrate neu-

tralized by ammonia, and the calcium salt is then decomposed by carbon dioxide.

GLYCERAMINE (gli-ser'a-min), in chemistry, a base obtained by passing ammonia gas into a solution of dibromhydrin C_3H_5''' (OH) Br_2 in absolute alcohol. Glyceramine is a liquid soluble in water and in ether.

GLYCERIA, in botany, manna grass, a genus of grasses, tribe *Festucæ*, family *Bromidæ*. The glumes are convex, five to seven nerved, the tip acute or obtuse.

GLYCERIN, or **GLYCERINE**, a triatomic alcohol of the fatty series, $C_3H_8O_3$, or CH_2 (OH·)·CH(OH)·CH_2 (OH). Glycerin was discovered in 1778 by Scheele, who obtained it in the preparation of lead plaster by saponifying lard with oxides of lead. Glycerin occurs in most natural animal and vegetable fats in combination with fatty acids, from which it can be obtained by saponifying with alkalies. It is also formed during the alcoholic fermentation of sugar. Pure glycerin is obtained by heating neutral fats in a still, with a condensing apparatus, and passing steam in small jets through the melted fat, the temperature being kept below 600° F., and above 550° F.; the fat acids separate out in the receivers from the glycerin and water; the glycerin is then concentrated by evaporation. Glycerin is a thick, colorless, inodorous, neutral syrup, which has a very sweet taste; it mixes with water in all proportions, is soluble in alcohol and in chloroform, but insoluble in ether. Glycerin distilled with phosphorous pentachloride, P_2Cl_5, yields acrolein. By the action of a mixture of equal parts of concentrated nitric acid and sulphuric acid, it is converted into NITROGLYCERIN, $CH_2 \cdot O \cdot (NO_2 \cdot) \cdot CH \cdot O (NO_2) \cdot CH_2 \cdot O (NO_2)$ (*q. v.*). Glycerin is used for preserving fruits, also as a solvent for various salts, and in preparing copying-ink; also as a lubricator for machinery and clockwork, and is placed over water in gas meters to prevent freezing, and is used for filling floating compasses. It is employed in the form of nitroglycerin in the preparation of dynamite, and for mixing with soap to form glycerin soap, which tends to soften the skin.

Glycerin is used on account of its physical properties as an adjunct to lotions in skin diseases to prevent the surface becoming dry. It can be used as a substitute for sugar in the diet of diabetic patients.

GLYCERYL OXIDE, in chemistry, glyceryl ether $(C_3H_5)_2O_3$. It is obtained by distilling glycerin with calcium chloride. It is a colorless oily liquid, boiling at 172°. It mixes with water, alcohol, and ether.

GLYCINE (glis'i-nē), in botany, the typical genus of the sub-tribe *Glycerineæ* the species, all but one of which are decumbent if not even twining, have alternate leaves with axillary racemes or fascicles of yellow flowers. Locality, the warmer parts of the Old World. *G. soja*, the erect species alluded to, is cultivated in the East Indies for its beans. From these the Japanese make a sauce called sooja or soy.

GLYCOCHOLIC ACID, an acid occurring as a sodium salt in the bile of most animals. It is obtained by covering fresh bile in a tall glass cylinder with a layer of ether, and adding 1 c. c. of strong HCl. to every 50 c. c. of bile; in a few days a crystalline mass is formed, which is filtered, washed with cold water, and crystalled out of boiling water; it forms fine needles, which melt at 100°, and are soluble in alcohol; when boiled with barito water it is decomposed into cholic acid and glycocine, $C_{26}H_4$, $NO_6 + H_2O = C_{24}H_{40}O_5 + C_2H_5NO_2$. Glycocholic acid forms salts which are called glycocholates, the glycocholates of the alkalies and earth metals are soluble in water and in alcohol. Glycocholate of sodium is precipitated from its alcoholic solution by ether; acetate of lead gives a precipitate which is soluble in alcohol.

GLYCODRUPOSE (glī-kô-drō'), in chemistry, the strong concretions in pears, produced by thickening and hardening of the cell walls, consists of this substance, together with a small quantity of mineral matter, which is removed by digesting them with dilute acetic acid.

GLYN, ELINOR, (MRS. CLAYTON), an English novelist, the daughter of Douglas Sutherland, of Toronto, Ontario. In 1892, she married Clayton Glyn, of Kent, England. Mrs. Clayton first attracted wide attention by the publication of her book, "Three Weeks" (1907), a work which produced a sensation by its suggestive qualities. Among her other works are; "Visits of Elizabeth" (1900); "The Damsel and the Sage" (1903); "Destruction" (1919).

GLYOXALIC ACID, also called glyoxylic acid, $C_2H_2O_3$ or CO·OH a dyad compound, containing an aldehyde and an acid radical. Obtained along with glyoxal by oxidation of ethyl-alcohol with nitric acid; also by heating at 140° one part of dichloracetic acid, $CHCl_2 \cdot COOH$ with 10 parts of water for 24 hours. Glyoxalic acid is a thick syrup, which

can be crystallized over H_2So_4. It is very soluble in water, and can be distilled in a current of steam. It is a monobasic acid, forming crystalline salts called glyoxalates. By oxidizing agents it is converted into oxalic acid; by nascent hydrogen it is reduced to glycollic acid. It has also the properties of an aldehyde, reducing ammoniacal solutions of silver salts, forming a metallic mirror; also unites with alkaline bisulphites. Glyoxalic acid, when boiled with excess of lime water, yields calcium glycollate and calcium oxalate.

GLYOXALINE, in chemistry, a substance obtained by treating glyoxal, kept cool on ice, with a slight excess of ammonia, glycosine separates as a powder, the filtered liquid is boiled with milk of lime, evaporated to a syrup, and extracted with alcohol, and distilling the alcoholic solution.

GLYOXYLIC ACID, CHO COOH or $CH(OH)_2$ COOH, a thick liquid, readily soluble in water, but can be prepared in the crystalline condition by long standing over sulphuric acid, in which case the compound has the second formula given above. It is found in young beets, unripe apples, plums, gooseberries, rhubarb, currants and grapes.

GLYPHIPTERYGIDÆ (glif-ip″te-rij′i-dē), a family of moths, group *Tineina*. The larva has 16 legs or is apodal. It generally mines in leaves.

GLYPTODIPTERINI (-ī′nī), in the classification of Professor Huxley, a family of fossil ganoid fishes, sub-order *Crossopterygidæ*. There are two dorsal fins, the scales are sculptured, the pectoral fins acutely lobate, dendition dendrodont. There are two sub-families, the one with rhomboidal, and the other with cycloidal scales. Under the latter family fall the genus *Holoptychius*, etc.

GLYPTODON, a huge fossil mammal, family *Dasypodidæ* (armadillos). It was incased in armor, there being bony plates on the head, and nearly hexagonal bony scutes on the body. It belongs to the Post-pliocene of South America. Including the tail, *G. slavipes* was more than nine feet long.

GMELINA (me-lī′nä) (named after Johann Georg Gmelin), a genus of *Verbenaceæ*, tribe *Viticeæ*. The leaves of *G. parviflora* render water mucilaginous. It may then be employed as a ptisan for the cure of ardor urinæ.

GMELINITE (mel′i-nīt) (named after Prof. Charles Gmelin), a colorless, yellowish-white, greenish-white, or reddish-white, fresh, transparent to translucent, brittle mineral, crystallizing in rhombohedrons. Sarcolite, lederevite, and hydrolite are varieties. Found at Andreasberg, in the Harz; at Montecchio, Maggiore, and Castel, in the Vincentine; in Cyprus; near Cape Blomidon, in Nova Scotia, etc.

GMÜND, a city of Württemberg, Germany, situated in the valley of the Rems, 32 miles S. E. of Stuttgart. It was famous prior to the World War for its manufacture of jewelry and articles of the precious metals, and was also the site of important industries in iron and bronze, notably scientific instruments. It became an Imperial free city in the thirteenth century and retained its independence until 1903. Pop. about 21,000.

GNAT (nat) a genus of dipterous insects represented by numerous widely distributed species, and especially abundant in marshy districts. There are nine British species, of which the common gnat (*Culex pipiens*) may be taken as typical. The color of the middle portion of the body on the upper surface is yellowish-brown, marked with darker longitudinal lines; the posterior part is light gray. The antennæ consist of 14 joints, and bear circlets of hair, which, in the male, may be so long and thick as to give a feathery appearance. The female is furnished with mandibles which are absent in the male. The male gnat sips nectar from the flowers and passes his days in dancing in the sunlight; the female spends her days and nights in pursuit of men and cattle from whom she may suck her more nutritious, if less delicate, diet. The proboscis, whose double function of piercing and sucking is an extremely complex structure composed of representatives of the three usual mouth appendages.

To strain at (an old misprint for out) a gnat and swallow a camel (Matt. xxiii: 24, Authorized Version). To strain out the gnat and swallow the camel. (Revised Version): Alluding to the care with which the Jews strained small insects out of the liquor they were about to drink. To be punctilious about trifles and careless in matters of importance.

GNATHODON (nath′ō-don), a genus of birds, called also DIDUNCULUS (*q. v.*). In zoölogy and palæontology, a genus of conchiferous mollusks, family *Mactridæ*. It is so called because one of the lateral teeth connected with the hinge has a certain resemblance to a jawbone. Recent species, one certain and three doubtful; fossil three, from the Chalk onward. The best-known recent species is *G. cuneatus*, which was formerly eaten by the Indians. It is found with *Cyrena carolinensis* at

Mobile, on the Gulf of Mexico, which is built on a shell bank consisting chiefly of the two species.

GNEISENAU (gnī'ze-nou), **AUGUST WILHELM ANTON, GRAF NEITHARDT VON**, a Prussian general; born in Schildau, Prussian Saxony, Oct. 27, 1760. In 1782 he accompanied the German auxiliaries of England to the American colonies. On his return he joined (1786) the Prussian army, and 20 years later fought at Saalfeld and in the battle of Jena. He gave convincing proof of his military genius in the defense of Colberg from April to July, 1807; and this led to his appointment on the commission for the reorganization of the Prussian army. In the war of liberation he rendered distinguished service at the battle of Leipsic (1813). But his most meritorious work was his share in the Waterloo campaign, in which he was chief of Blücher's staff, and principally directed the strategy of the Prussian army. He had been 15 years on the retired list when, in 1831, on the outbreak of the Polish rebellion, he was made field-marshal and given command of the Prussian army on the Polish frontier. He died in Posen, Aug. 24, 1831.

GNEISS (nīs), a metamorphic rock, consisting of orthoclase, quartz, and mica. It is akin to mica schist, which, however, is distinguished by having less orthoclase and more mica. It has exactly the same materials as granite, but is stratified or foliated. Sometimes hand specimens are found, in which lamination is so little traceable that they might pass for granite. Fundamental gneiss, Laurentian gneiss, the name given by Sir Roderick Murchison to the oldest stratified rock in Scotland. It is found in the N. W. of Ross-shire and in Sutherlandshire, besides forming the whole of the adjoining island of Lewis in the Hebrides. It has a strike from N. W. to S. E., nearly at right angles to the metamorphic strata of the Grampians. The Lower Cambrian and various metamorphic rocks rest on it unconformably.

GNEIST, HEINRICH RUDOLF HERMANN FRIEDRICH VON (nīst), a German jurist; born in Berlin, Aug. 13, 1816. He entered official life as assessor in the Superior Court (*Kammergericht*) in 1841, and was successively assistant-judge of the same court and of the supreme tribunal, till in 1850 he resigned this position in order to devote himself exclusively to teaching; for since 1844 he had held the chair of jurisprudence in Berlin University. From 1858 he sat in the Prussian Lower House as a National Liberal, and was also elected to the Imperial Parliament, of which he was a conservative member until 1884. He wrote: "Organization of the German Jury" (1849); "Nobility and Knighthood in England" (1853); "Present English Constitutional and Administrative Law" (3d edition, 1876-1884), his masterpiece; "Government of the City of London" (1867); "History of the English System of Government" (1882); "The English Parliament" (1886); etc. He was ennobled in 1888, and died July 21, 1895.

GNESEN (gnā'zen) (Polish Gniezno), a Polish town, in a region of hills and lakes, 31 miles E. N. E. of Posen. It has a Catholic cathedral, dating from 965, and till 1320 was the coronation place of the Polish kings. It passed to Prussia in 1814 and was ceded to Poland in 1920.

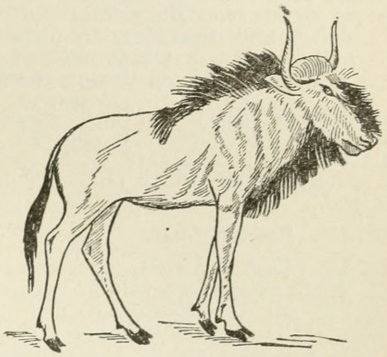
GNETACEÆ (nē-tā'se-ē), in botany, joint-firs; an order of gymnogens, with repeatedly-branched jointed stems and simple net-veined leaves, opposite and entire, sometimes very minute and scale-shaped; flowers in catkins, or heads; the males with a one-leaved calyx, transversely slit at the end; a monadelphous filament, with one-celled anthers opening by pores; females, altogether naked or sheltered by a false calyx, consisting of two scales, each surrounding two flowers; ovary, none; ovule with a style-like process. Known genera, two—viz., *Gnetum* and *Ephedra;* species, 15, scattered over the world.

GNETUM (nē'-) (Corrupted from gnemon, the name given to the plant in the island of Ternate), in botany, the typical genus of the order *Gnetaceæ* (*q. v.*). The species are found in the hottest parts of India and Guiana. In Amboyna the seeds of *G. gnemon* are eaten boiled, roasted, or fried, and the green leaves, though tasteless, are used as spinach.

GNOME (nōm), in mediæval mythology, the name given by cabalistic writers to one of the classes of imaginary beings which are supposed to be the presiding spirits in mysterious operations of nature in the mineral and vegetable world. They have their dwelling within the earth, where they preside specially over its treasures, and are of both sexes, male and female. The former are often represented in the form of misshapen dwarfs, of whom the well-known "Rübezahl," or "Number-nip," of German legend is a familiar example. Pope, in the "Rape of the Lock," and Darwin, in the "Loves of the Plants," have drawn on the more pleasing associations of this curious branch of mythology. Also a small and ill-favored person; a dwarf; a misshapen being.

GNOSTICISM (nos'-), a system of philosophy professedly Christian, devised to solve the great questions, such as the origin of evil, which have perplexed the ablest minds in every age. Gnosticism accepted beliefs in an eternal God of infinite power, wisdom, and goodness. The granting of this postulate at once brought the gnostic face to face with the question, Why then did this Great Being allow evil to arise in the universe, when it was in His power to have prevented it? If He did not prevent it, was He not to a certain extent responsible for its existence? The same difficulty had centuries before created the dualist system of Zoroastrianism, which, denying the omnipotence of the one Supreme Being, assumed the existence of two, a good and a bad one, about equal in power, and in continual conflict. This view, derived from Persia, was partially adopted by some gnostics, while others of the sect, or aggregation of sects, drew on the later Platonism of Alexandria for their inspiration. There were then two classes of them: the Syrian, and the Alexandrian, or Egyptian gnostics. In certain tenets both agreed. Matter was eternal, and from the first essentially evil; there was then no bygone time when the "origin of evil" took place. Nor was the world created by the Supreme Being; it was framed by an exalted spirit, called in consequence the DEMIURGE (*q. v.*), whom many identified with the God of the Jews. He had shining qualities, but was selfish and arrogant. He wished men to worship, not the Supreme Being, but himself. The former was the purest Light, and pervaded that boundless space which the Greeks called pleroma. He did not remain forever alone, but brought into existence two holy and happy spirits of different sexes, called Æons, from whose marriage came others of the same order, till there was a whole family of them in the pleroma. The chief of these Æons was Jesus Christ, who was sent to the world to win it back from the Demiurge to its proper allegiance. Many gnostics held what were called Docetic views. The germs of gnosticism existed in the 1st century; it did not, however, reach maturity till the reign of Adrian in the 2d. Of the Syrian gnostics there were Saturninus of Antioch, Cerdo, Marcian, Lucian, Severus, Blastes, Bardesanes, Tatian, etc.; of the Egyptian Basilides of Alexandria, Valentinus, etc. The system had a good deal declined by the 3d century, but was not extinct till about the 6th. It has been disputed whether there are allusions to either nascent or fully developed gnosticism in the New Testament. Some writers profess to find them in such passages as Col. ii: 8; I Tim. i: 4, vi: 20: II Tim. ii: 16, 17; Titus iii: 9; and there appears to be one to Doceticism in I John i: 1-3.

GNU (nö), in zoölogy, *Catoblepas gnu*, a species of antelope. The adult male is about 5 feet 6 inches long, and 3 feet 10 inches high at the shoulder; horns, dark, broad, upon the summit of the head, tapering out sideways over the eyes, and turning up into a pointed hook. Legs long. The face is covered with black,



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bristly hair, with white ones around the eye and on the legs; on the neck is a vertical mane, black in the center and white at the sides; a bushy beard on the under jaw; general color of the fur deep brown, with long white hair on the tail. Female smaller; calves pure white. A gnu brought to bay or wounded turns on its assailant.

GOA (gō'ä), a maritime city of India, chief city of the district of the same name, and formerly capital of all the Portuguese settlements in India, on an island of the same name, at the mouth of the Mandona, 250 miles S. S. E. of Bombay. Goa consists of Old Goa and New Goa. The old city contains some splendid churches and other specimens of architecture. New Goa, or Panjin, at the mouth of the river, is the residence of the viceroy and of the principal inhabitants. It carries on trade with Portugal, China and the coast of Africa, and is principally engaged in the salt industry. Pop. of the district about 515,800.

GOA, an antelope found in the vicinity of Tibet.

GOAL, the winning post in a race; the point or mark set to bound a race. In FOOTBALL (*q. v.*), the space marked by goal posts and a cross bar to define the required path of the ball in order that

a "goal" may be scored. According to Rugby rules, the ball must be kicked over the cross bar; according to association rules, it must go under. Also the act of kicking the ball through or over the goal posts.

GOALANDA (gō-a-län'dä), a market-town of Bengal, on a tongue of land at the confluence of the main streams of the Ganges and Brahmaputra, an important entrepôt for the river trade, the terminus of the Eastern Bengal railway, and the starting point of the Assam steamers. Busy markets are held daily, and the river is crowded with native craft, in which most of the trade is carried on, and fishing boats.

GOA POWDER, a powder deriving its name from the island of Goa, on the Malabar coast; it is very bitter and is the material from which chrysarobin is obtained.

GOAR. See ST. GOAR.

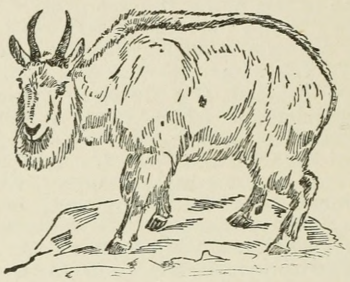
GOAT, *Capra hircus*, the domestic goat, which exists, in a wild or semi-wild state, in all the European mountain ranges. It is generally supposed that it may be a descendant of the paseng of Persia (*C. ægagrus*). The males fight furiously with each other in the rutting time. They have an offensive smell. A most important variety, formed into a breed by artificial selection, is the Angora goat, where almost the whole body is enveloped in that long, silky, white hair. The Angora goat has been introduced into Cape Colony, Australia, and the United States. The Kashmir



ANGORA GOAT

goat, from Tibet and Bokhara, is almost equally valuable, furnishing the white to brown hair used in making Kashmir wares. It has been successfully acclimatized in France. A third variety, is the Mamber goat from Asia Minor and Tartary, distinguished by its long pendent ears. The Syrian goat, which also has long ears, is trained in the East to all manner of tricks. The Alpine ibex is a magnificent goat, without beard, but with very strong, slightly divergent much-ridged horns. It is now rare.

The goat is capable of the most perfect domestication, and becomes extremely attached and familiar. The flesh is good; that of the kid, or young goat, is in most countries esteemed a delicacy. Requiring but little attention,



ROCKY MOUNTAIN GOAT

and able to subsist on rough diet, the goat is in many countries "the cow of the poor." The milk is very rich and nutritious, more easy of digestion than that of the cow, and often useful to consumptive patients. Both cheese and butter are made of goats' milk; they have a peculiar but not disagreeable flavor. Goats' milk is still very much used in Syria and other parts of the East. The skin of the goat was early used for clothing, and is now dressed as leather for making gloves and the finer kinds of shoes (see GLOVES). The hair is used for making ropes which are indestructible in water, and for making wigs for judges, barristers, and other functionaries. For the latter purpose the hair of white goats is used. The horns are used for making knife handles, etc., and the fat is said to be superior to that of the ox for candles. The Rocky Mountain goat is an antelope rather than a goat. See ANGORA GOAT.

In Christian art the goat is an emblem of impurity.

GOATFISH, *Balistes capriscus*, a fish of a brownish-gray color, spotted with blue, or greenish. Its flesh is little esteemed. Its appropriate habitat is the Mediterranean.

GOAT MOTH, *Cossus ligniperda*, a large moth belonging to the family *Zenzeridæ*. The fore wings are pale brown, clouded with whitish, and marked with numerous short, irregular transverse wavy black lines; hind wings pale-smoky, with similar transverse dark

lines, but less distinct. It feeds on the wood of willows, poplars, and oaks, sometimes perforating the wood in all directions.

GOATSUCKER, one of the English names of a remarkable migratory bird, *Caprimulgus europæus*. The erroneous belief that it sucks goats seems to have arisen among the goatherds in ancient Greece, who called it aigotheles, from *aix* (genit. *aigos*) =a goat, and *thele*= the nipple; and the Romans, falling into the same error, denominated it caprimulgus.

GOBBE, or VOANDZOU (*Voandzeia subterranea*), a leguminous annual of tropical Africa, sub-order *Cæsalpineæ*, of which the young pod is thrust into the ground in the same manner as that of *Arachis hypogæa* (the ground bean), thus at once protecting and planting the seeds. The rich, oily seeds (Angola peas) are wholesome and agreeable when boiled. The young pods also are used like French beans.

GOBELIN (gob-lan'), a family of French tapestry-makers and dyers who became famous for the exquisite tapestries they manufactured. They were descended from Jean Gobelin, who founded the establishment in Paris and died in 1476. About 1667 the manufactory was turned into a royal establishment under Louis XIV. The factory still produces the finest tapestry in the world.

GOBI (gō'bē), **DESERT OF**, the Shamo or "sand-sea" of the Chinese, an immense tract of desert country, occupying nearly the center of the high tableland of eastern Asia, between lat. 35° and 45° N., and lon. 90° and 110° E., and extending over a large portion of Mongolia and Chinese Turkestan. Its length is probably about 1,800 miles; mean breadth, between 350 and 400 miles; area, 300,000 square miles. Its general elevation is over 4,000 feet above sea-level. The East Gobi is occupied by different tribes of the Mongolian race, who have numerous herds of camels, horses, and sheep. In the West Gobi are some nomadic tribes of the Tartar race. This tract is supposed at one time to have been a great inland sea. In 1917, motor car service was inaugurated to carry freight across the desert between Kaljan and Urgi.

GOBIIDÆ (gō'bi-i-dē), or **GOBIOIDÆ** (-oi'dē), in ichthyology, gobies, a family of *Acanthopteri veri*. The edges of the operculum are unarmed, and its aperture small; the ventral fins, whether united or separated, constitute a funnel, and are situated on the breast; the skin is either naked or armed with large finely ctenoid scales. Most of them are small fishes, found among rocks or in tidal rivers.

GOBONATED, in heraldry, an epithet applied to a border, pale, bend, or other charge divided into equal parts forming squares, gobbets, or checkers. Called also goboné, or gobony.

GOD, the Supreme Being. The form god is used for any superior or imaginary being, constituting an object of worship; or for (1) an emperor, king, or any other person, yielding great and despotic power; (2) any person or thing greatly idolized.

Ethnic Religions.—Whether any savage tribes exist with no belief in any being higher than man is doubtful. Lubbock thus arranges the first great stages in religious thought: Atheism, understanding by this term, not a denial of the existence of a Deity, but an absence of any definite ideas on the subject. Fetichism, the stage in which man supposes he can force the Deity to comply with his desires. Nature-worship, or totemism, in which natural objects, trees, lakes, stones, animals, etc., are worshiped. Shamanism, in which the superior deities are far more powerful than man, and of a different nature. Their place of abode also is far away, and accessible only to Shamans. Idolatry or anthropomorphism in which the gods take still more completely the nature of men, being, however, more powerful. They are still amenable to persuasion; they are a part of nature, and not creatures. They are represented by images or idols. In the next stage the Deity is regarded as the author, not merely a part of nature. He becomes for the first time a really supernatural being. The last stage is that in which morality is associated with religion.

Judaism.—Two leading names for the Supreme Being continually occur in the Hebrew Bible; the one generic, the other specific. The generic term is El, or Eloah, both singular, and ELOHIM (*q. v.*) plural, the specific one is Yehovah, in general written JEHOVAH (*q. v.*). It is of the first that God is the appropriate rendering. El, Eloah, and Elohim signify Deity in general. Elohim is much more common than the singular forms. Among the epithets or titles used of God in the Old Testament are Most High (Gen. xiv: 18, etc.), Mighty (Neh. ix: 32), Holy (Josh. xxiv: 19), Merciful (Deut. iv: 31), God of Heaven (Ezra i: 2), God of Israel, etc. (Exod. xxiv: 10). Anthropomorphic language occurs chiefly, though not exclusively, in the

poetic parts of the Old Testament (II Chron. xxx: 12, Psa. xx: 3, Deut. viii: 3, Psa. xxix: 4, Isa. xl: 12, liii: 1, lx: 13, Exod. xxxii: 23), but monotheism is enjoined in the first commandment, and idolatry forbidden in the second, while in Isaiah and elsewhere there are most scathing denunciations of the manufacture and worship of images (Isa. xl: 12-26, xlii: 17, xliv: 9-20, etc.). In the New Testament, St. John gives the ever-memorable definition of the Divine nature. "God is love" (I John iv: 16). The Latin Church, the Greek Church, and the several Protestant denominations all essentially agree in their tenets regarding God. See the Apostles', Nicene, and Athanasian Creeds, the first of the Thirty-nine Articles, the Catechism of the Council of Trent, the Confession of Faith (ch. ii.), and the Shorter Catechism, question 4. See THEOLOGY; TRINITY.

The name of God in 47 languages:

Hebrew—Elohim, Eloha.
Chaldaic—Eilah.
Assyrian—Eleah.
Syriac and Turkish—Alah.
Malay—Alla.
Arabic—Allah.
Old Egyptian—Teut.
Armorian—Teuti.
Modern Egyptian—Teun.
Greek—Theos.
Aeolian and Doric—Ilos.
Latin—Deus.
Low Latin—Diex.
Celtic and Gallic—Diu.
French—Dieu.
Spanish—Dios.
Portuguese—Deos.
Old German—Diet.
Provençal—Diou.
Low Breton—Doue.
Italian—Dio.
Irish—Dia.
Olalu Tongue—Deu.
German—Gott.
Flemish—Goed.
Dutch—Godt.
English and Old Saxon—God.
Teutonic—Goth.
Danish and Swedish—Gut.
Norwegian—Gud.
Slav—Buch.
Polish—Bog.
Pollacca—Bung.
Lapp—Jubinal.
Cretan—Thios.
Finch—Jumala.
Runic—As.
Zemblain—Fetiza.
Pannonian—Istu.
Hindostanee—Rain.
Coromandel—Brama.
Tartar—Magatal.
Persian—Sire.
Chinese—Prussa.
Japanese—Gœzur.
Madagascar—Zannar
Peruvian—Puchecammae.

GODAVARI (gō-dä'va-rē), one of the principal rivers of India, and the largest of the Deccan, rising within 50 miles of the Indian Ocean, and flowing S. E. across the peninsula into the Bay of Bengal, which it enters by seven mouths, after a course of 898 miles, its total drainage area being estimated at 112,000 square miles. It has been called the Indian Rhine. The navigation of the upper waters is impeded by three impassable rocky barriers or rapids within a space of 150 miles. The Godavari is one of the 12 sacred rivers of India, and the great bathing festival, called Pushkaram, is held on its banks once in 12 years; each of its seven mouths is esteemed holy, but especially the Gautami mouth, the larger of its two arms, which enters the sea not far from Cocanada.

GODERICH, a port of entry of Ontario, on Lake Huron, 160 miles W. N. W. of Buffalo by rail, with a good harbor protected by a pier, also several factories and mills, and eight salt wells.

GODESBERG, a watering place in the Prussian Rhine province, Germany, situated near the left bank of the Rhine four miles below Bonn. It is famous for its medicinal springs and for its hydropathic sanitarium. Brickmaking is an important industry, but the town is largely residential, inhabited by health seekers from all over Europe. The population is about 10,000.

GODFATHER and **GODMOTHER** (also called sponsors), the persons who, by presenting a child for the sacrament of baptism, which is regarded as a new spiritual birth, are reputed to contract toward the newly baptized the relation of spiritual parentage. In the Roman Catholic Church this spiritual relationship is regarded as a species of kindred (whence the name gossip, or God-sib, "spiritually akin"), and constitutes an impediment of marriage between the sponsors on the one hand and the baptized and the parents of the baptized on the other. Anciently, this impediment arose also between the sponsors themselves; and it still extends much further in the Eastern than in the Western Church, though in the former it can arise only from baptism, whereas in the Roman Church the candidate for confirmation also is presented by a sponsor, though usually one of the same sex.

In the Anglican Church, by whose rule two godfathers and a godmother are required at the baptism of a male, and two godmothers and a godfather at that of a female, no impediment of marriage arises from the relation of the sponsors to the baptized. The parents of the baptized are not permitted to act as sponsors in the Roman Catholic Church, one of the objects of the institution being to provide instructors in case of the death

of parents; but the present rule of the Church of England, following the rubric of the American Prayer Book, does so allow.

GODFREY, EDWARD SETTLE, an American soldier, born in Kalida, O., in 1843. He was educated in the public schools and at Vermilion Institute. He served throughout the Civil War as a private and at the close entered the United States Military Academy from which he graduated in 1867. In the same year he was appointed 2d lieutenant. He rose through the various grades, becoming colonel of the 9th Cavalry in 1901, and brigadier-general in 1907. He saw much service against the Indians in the West and was awarded the Congressional Medal of Honor in 1877. He took part in all the campaigns under General Custer until the later's death. From 1879 to 1883 he was instructor of cavalry tactics at the United States Military Academy. He saw service in Cuba and in the Philippine Islands and was retired by operation of the law, in 1907. He wrote "Custer's Last Battle" (1892). He was a member of many military societies.

GODFREY, HOLLIS, an American educator and engineer, born at Lynn, Mass. in 1874. He graduated from Tufts College in 1895 and took post-graduate courses at the Massachusetts Institute of Technology and at Harvard. From 1898 to 1905 he engaged in teaching engineering, and from 1906 to 1910 was head of the department of science at the School of Practical Arts, in Boston. He was consulting engineer to the cities of Philadelphia, Atlantic City, and several private corporations, from 1910-1917. In 1913 he was chosen president of the Drexel Institute of Philadelphia. During the World War he was commissioner of the advisory committee of the Council of National Defense, and was in charge of its section of engineering and education. He was a member of many engineering societies. He wrote "The Man Who Ended War" (1908); "Elementary Chemistry" (1909); and "The Health of the City" (1910). He was a frequent contributor to engineering and scientific journals.

GODFREY OF BOUILLON (bō-yôn'), leader of the first crusade, son of Eustace II., Count of Boulogne; born near Nivelles, in 1061. He distinguished himself while fighting for the Emperor Henry IV. in Germany and Italy, and was made Duke of Bouillon. In order to expiate his sin of fighting against the Pope, he took the cross for the Holy Land in 1095, and led 80,000 men to the East by way of Constantinople. On May 1, 1097, they crossed the Bosporus, and began their march on Nice (Nicæa), which they took in June. In July the way to Syria was opened by the victory of Dorylæum (Eski Shehr), in Phrygia, and before the end of 1097 the crusaders encamped before Antioch. The town of Antioch fell into their hands in 1098, and in the following year Godfrey took Jerusalem itself, after five weeks' siege. The leaders of the army elected him king of the city and the territory; but Godfrey would not wear a crown in the place where Christ was crowned with thorns; and contented himself with the title of Duke and Guardian of the Holy Sepulcher. The defeat of the Egyptians at Ascalon placed him in possession of all the Holy Land, excepting two or three places. Godfrey now turned his attention to the organization of his newly established government, and promulgated a code of feudal laws called the Assize of Jerusalem. Godfrey was a favorite subject of mediæval poetry, and is the central figure of Tasso's "Jerusalem Delivered." He died in Jerusalem, July 18, 1100.

GODIVA (gō-dī'vä) the wife of Leofric, Earl of Mercia and Lord of Coventry in the reign of Edward the Confessor. Tradition says that, in 1040, she rode on her palfrey naked through the town of Coventry on her husband's promise that, if she would do so he would relieve the inhabitants of certain exactions which bore heavily on them. She had first proclaimed that no one should leave his house before noon, that all windows and other apertures in the houses should be closed, and that no one should even look out till noon was past. Only one person, "Peeping Tom," the story says, attempted to look out, and he was immediately struck blind. A yearly pageant, in which a young woman enacted the part of Godiva, was long kept up at Coventry, and still occasionally takes place. Tennyson based one of his delightful poems on this incident.

GODKIN, EDWIN LAWRENCE, an American journalist and essayist; born in Moyne, Ireland, Oct. 2, 1831. He graduated from Queen's College, and came to the United States in early manhood. After 1865 he was prominent in journalism. In addition to a "History of Hungary," and editorial work on the New York "Nation" and "Evening Post," he produced miscellaneous essays, the most prominent of which appear in "The Problems of Modern Democracy" and "Reflections and Comments"; also "Unforeseen Tendencies of Democracy" (1898). He died in 1902.

GODLESS MONTH, in comparative mythology, the 10th month of the Japanese year, so called because then the lesser divinities were considered to be absent from their temples, for the purpose of paying the annual homage due to the celestial Dairi.

GODMER, a British giant, son of Albion, slain by Canutus, one of the companions of Brute.

GÖDÖLLÖ (ge-del-le), a market-town of Hungary, 15 miles N. E. of Pest, with a royal castle and park presented by the Hungarians in 1867 to their king, the Emperor of Austria-Hungary. Here, April 7, 1849, the Austrian forces were defeated by the Hungarians. Pop. about 6,000.

GODOY, MANUEL DE (gō-doi'), a Spanish statesman; born in Badajoz, Feb. 12, 1767. He went to Madrid at an early age; in 1787 entered the company of bodyguards; was called to the council of state; in 1792 succeeded Aranda as first minister, and immediately declared war on France. At the peace in 1795 he was made a grandee of Spain of the first class, and received the title of Prince of the Peace. Signing, in opposition to the general desire of the nation, the treaty of St. Ildefonso, an offensive and defensive alliance with France, in 1796, he found all parties and classes in the state his enemies and was forced to resign office in March, 1798. Soon reinstated, he married, from political motives, Donna Maria Thereza de Bourbon, though he was already secretly married to Donna Josefa Tudo. In 1800 he commanded an expedition against Portugal. He attached himself to Napoleon; the insurrection of Aranjuez, in March, 1808, prevented his escape as purposed with the royal family, and on the abdication of Charles he was imprisoned. He was present at Bayonne on the signature of the new abdication, and he accompanied the royal family to Marseilles and Rome. On his wife's death he avowed his marriage with Josefa Tudo; settled at Paris in 1835, and died there Oct. 7, 1851.

GOD'S ACRE, a burying-ground attached to a church or place of worship.

GOD'S TRUCE, in the Middle Ages, a means introduced by the Church to check in some measure the hostile spirit of the times, by establishing certain days or periods during which all private feuds were to cease. It seems to have taken its rise about latter part of the 10th or beginning of the 11th century. At first the Church forbade all feuds on those days of the week which were especially consecrated by the death and resurrection of Christ; namely, from Thursday evening to Monday morning. Afterward the period was extended so as to include the whole of Thursday and from the beginning of Advent to the Epiphany, and certain other times and saints' days. The precincts of churches, convents, and graveyards were also interdicted from any hostile encounters.

GODWIN, Earl of the West Saxons. He was probably son of the South-Saxon Wulfnoth, who was outlawed in 1009, and regained his father's lands by his conduct in the contest with Canute. By 1018 he was an earl, and the year after he married the daughter of Ulf, and soon became Earl of the West Saxons. In 1042 he took the foremost part in raising Edward to the English throne, and was rewarded by the marriage of his daughter Edith to the English king. Godwin led the struggle against the worthless king's fondness for foreign favorites, and thus incurred the enmity of the court party. The king heaped insults on Queen Edith, seized her dower, and her money, and closely confined her in the monastery of Wherwell. Godwin and his sons were banished, but they contrived to keep alive the antipathy of the English to the Norman favorites of Edward, and in the summer of 1052 landed on the S. coast of England. The royal troops, the navy, and vast numbers of the burghers and peasants went over to Godwin; and finally the king was forced to grant his demands, and replace his family in all their offices. Godwin died April 14, 1053.

GODWIN, MARY, also known by her maiden name of MARY WOLLSTONECRAFT, an English author; born in London, April 27, 1759. She set up a school in conjunction with her sister, at Islington in 1783. In 1786 she published "Thoughts on the Education of Daughters." This was followed by an answer to Burke's "Reflections on the French Revolution." the "Vindication of the Rights of Woman," etc. She had peculiar ideas on marriage, and formed a somewhat loose connection with one Imlay, whose desertion caused her to attempt suicide. Some time after she fixed her affection on William Godwin. As the bonds of wedlock were deemed a species of slavery in her theory, it was only to legitimize the forthcoming fruits of the union that a marriage between the parties took place. She died in giving birth to a daughter, who became the wife of Shelley the poet. Among her other works are: "Moral and Historical View of the French Revolution"; "Letters from Sweden, Norway, and Denmark." She died in London, Sept. 10, 1797. See GODWIN, WILLIAM.

GODWIN, PARKE, an American journalist and author; born in Paterson, N. J., Feb. 25, 1816; was graduated at Princeton College in 1834; studied law and was admitted to practice, but preferreed literary pursuits. He married a daughter of William Cullen Bryant, and from 1837 was for many years connected with the New York "Evening Post." During the administration of President Polk he was deputy collector of New York. He edited in 1843-1844 "The Pathfinder," and was for some years a contributor to the "Democratic Review." Of "Putnam's Magazine" he was for a considerable time the principal editor. He published "A Popular View of the Doctrines of Fourier" (1884); "Goethe's Autobiography"; translated and edited Zschokke's "Tales"; "Undine"; "Sintram and his Companions"; "Handbook of Universal Biography" (1851); "Constructive Democracy"; "History of France" (1860); "Out of the Past" (1870); "Biography of William Cullen Bryant" (1883); "The Sonnets of Shakespeare" (1900); etc. He died Jan. 7, 1904.

GODWIN, WILLIAM, an English political writer and novelist; born in Wisbeach, England, March 3, 1756. His father (1723-1772) was a dissenting minister. William was educated at Hoxton Presbyterian College; preached as a dissenting minister, 1777-1782. He turned radical, and devoted himself to literature. He married Mary Wollstonecraft in 1797, though he had objections on principle to marriage. He wrote "Inquiry Concerning Political Justice, etc." (1793); "History of the Commonwealth" (1824-1828); the novels, "Caleb Williams" (1794); "St. Leon" (1799); "Mandeville" (1817); etc. He also published histories of Rome, Greece, and England, a "Pantheon," and "Fables" under the pseudonym of Edward Baldwin. He died in London, April 7, 1836. See GODWIN, MARY.

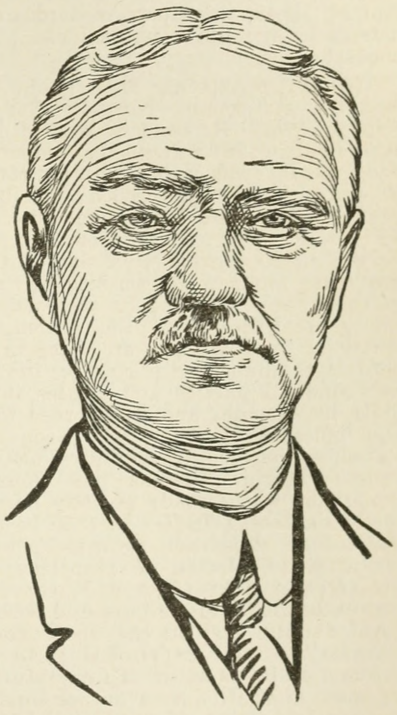
GODWIN-AUSTEN, MOUNT, a peak of the W. Himalayas supposed to be the second highest in the world. Its height is 28,250 feet.

GODWIT, a wading bird, *Limosa melanura*, and the genus *Limosa* generally. They undergo a double moult, having red plumage when young, and then, after moulting, black with a base of white; on the wings also is a white spot. The female is larger than the male. The godwit occurs in Europe, also in Africa and India.

GOEMOT (gō-ē'mot), or **GOEMAGOT** (-em'a-got), the giant who dominated over the W. horn of England, slain by Corineus, one of the companions of Brute.

GOERIUS, a genus of beetles, family *Staphylinidæ*. *G. olens*, which is sometimes called the Devil's coach-horse, is now *Ocypus olens*.

GOETHALS, GEORGE WASHINGTON, an American engineer; born at Brooklyn, N. Y., June 29, 1858; received his collegiate training at the College of the City of New York, and entered the United States Military Academy in 1876. Upon his graduation in 1880, he was appointed second lieutenant in the Engineer Corps. From which rank he continued



MAJOR-GENERAL GEORGE W. GOETHALS

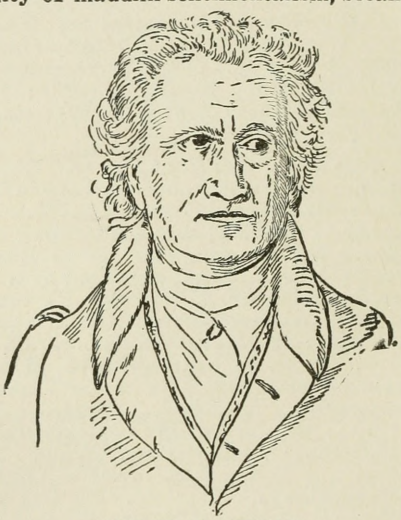
to rise, until, in 1909, he became colonel, and in 1916 retired with the rank of Major-general. He saw service in the Spanish-American War as lieutenant Colonel and chief of engineers of the United States Volunteers. Previous to this, he had acted as assistant professor of military engineering at West Point from 1885 to 1887, and had been engineer in charge of the important Mussel Shoals canal construction on the Tennessee river in 1888. In recognition of his ability he was appointed to membership on the Board of Fortifications and, in 1903, was made a member of the gen-

eral staff. After President Roosevelt had decided to undertake the construction of the PANAMA CANAL (*q. v.*), as a government operation entirely, he appointed Colonel Goethals chairman and chief engineer of a new commission made up of army and navy technical experts, which superseded the former civilian commission. Colonel Goethals brought to the work a wide familiarity with the conduct of government engineering operations, a practical knowledge of large scale supervisory and administrative engineering, plus a thorough technical and theoretical equipment. Under his leadership the business of building the canal quickly assumed a systematic, efficient aspect which permeated every division of the great work. The giant problems of machinery, excavation, labor control, sanitation, developed a harmony of organized effort under his control. Intrusted with wide executive powers, Colonel Goethals succeeded in eliminating points of friction which had so largely delayed progress on the work previous to his appointment. In his selection of assistants he exhibited that rare administrative insight which justified his appointment. The social and sanitary problems were satisfactorily solved under the direction of Gen. William C. Gorgas, and the total result was a degree of industrial efficiency which astonished the engineering world, and which made the completion of the canal a practical actuality by 1914.

Highly honored for his services to the world, Colonel Goethals received recognition from the University of Pennsylvania which, in 1913, conferred the degree of LL.D. upon him. In 1914 the Civic Forum of New York, the National Institute of Social Sciences, and the National Geographic Society awarded him medals.

After declining the office of Police Commissioner of New York City, offered to him by Mayor Mitchel, and refusing the position of City Manager of Dayton, O., he accepted the office of Civil Governor of the Canal Zone in 1914. He resigned as Governor of Canal Zone in 1916. During the World War he was a member of the Shipping Board and adviser to the Secretary of War and the Council of National Defense. Upon the conclusion of peace he retired to private life as a consulting engineer.

GOETHE, JOHANN WOLFGANG VON (ge'te) a famous German poet, dramatist, and prose writer, the regenerator of German literature; born in Frankfort-on-the-Main, Germany, Aug. 28, 1749. His father was a counsellor of state, and young Goethe was reared amid all the elements conducive to a taste for, and cultivation of, literature and the arts. In 1764 he proceeded to the University of Leipsic, and four years afterward to that of Strassburg, in order to qualify himself for the legal profession. In 1771, after taking his doctor's degree, he went to reside at Wetzlar. Here, in 1773, he produced his romantic drama of "Goetz of Berlichingen," which excited great enthusiasm in the German literary world. About this time he conceived a passion for a lady who was already betrothed, and who shortly after became the wife of another; which incident, together with the suicide of a student of his acquaintance—also a sufferer from misplaced affection—he fused together to form the plot of a novel, which, in 1774, he brought out under the title of "The Sufferings of Young Werther." This book, in its sublimity of maudlin sentimentalism, became



JOHANN W. GOETHE

at once the rage. In 1775 Goethe was invited by the Duke of Saxe-Weimar to take up his residence at his court. At Weimar he became the central figure of a circle of eminent men that included Wieland, Schiller, and Herder. Goethe was also appointed a privy councillor of legation and superintendent of the theater, where he brought out with thorough effect the splendid chefs-d'œuvre of Schiller, in addition to his own dramatic works—"Goetz of Berlichingen," "Iphigenia in Tauris," "Faust," "Tasso," "Clavigo," "Stella," and "Egmont." In 1786 he visited Italy, where he remained for two years, and in 1792, accompanied the army of the King of Prussia and the Duke of Brunswick in its French campaign, of which he became the historiog-

rapher. On his return, Goethe was appointed minister of state. In 1795 appeared the first part of his "William Meister," and in 1797 "Hermann and Dorothea," the finest of his minor productions. In 1805 the first portion of his great masterpiece, "Faust," appeared and raised him to the highest rank of literary fame. In 1807, the Czar Alexander of Russia conferred on Goethe the order of St. Alexander Newski—an example followed by Napoleon with the grand cross of the Legion of Honor. In 1809 appeared his "Elective Affinities," a work in which he advanced certain views on the marital relation which disgusted the moralists. The year 1818 beheld the second part of his "William Meister," the "Wandering Years," and in 1831, the second part of "Faust." Goethe died in Weimar, March 22, 1832.

GOFF, NATHAN, United States senator from West Virginia, born in Clarksburg, W. Va., in 1843. He was educated at Georgetown College and at the University of the City of New York. During the Civil War he served in the Union Army, rising to the rank of major. He was admitted to the bar in 1866 and in the following year he was elected to the West Virginia House of Representatives. He was an unsuccessful candidate for governor of the State in 1876. President Hayes appointed him Secretary of the Navy in 1881. He was United States district attorney in the following year, and was a member of Congress from 1883 to 1889. From 1892 to 1911 he was United States circuit judge, and was judge of the United States Circuit Court of Appeals in 1912-1913. In the latter year he was elected United States senator for the term ending 1919. He died in the latter year.

GOFFE, WILLIAM, an English parliamentary soldier, one af the judges of Charles I.; born about 1605. He became a major-general in the Parliamentary army, sat in the House of Commons and in Cromwell's "other house," and was one of the judges who signed Charles I.'s death-warrant. In 1660, with his father-in-law, Edward Whalley, he fled to America; they lay in hiding about New Haven from 1661 to 1664, when they went to Hadley, Mass. There they lived for many years in seclusion. According to tradition, when the townsmen were called from the meeting-house to repel an Indian attack, and were standing irresolute, Goffe put himself at their head and drove off the redskins, and then disappeared as suddenly as he had come. He died in Hadley, Mass., in 1679.

GOG and MAGOG, names several times used in the Bible, and given to the famous figures of giants in the Guildhall, London. Magog is spoken of by the writer of Genesis as a son of Japhet; Ezekiel speaks of Gog, Prince of Magog, as a terrible ruler in the far N., united with the Persians, Armenians, and Cimmerians against Israel; Gog and Magog in the Apocalypse appear as co-ordinate terms comprehending all future enemies of the kingdom of God. The name Magog was often applied generally to all the unknown races N. of the Caucasus.

GOGOL, NIKOLAI (gō'gol), a Russian novelist and miscellaneous writer; born in the government of Poltawa, March 31 (N. S.), 1809. He is the author of the novels "Dead Souls" and "Taras Bulba"; of a comedy entitled "The Revisor," and two collections of short tales illustrative of rural life in Little Russia, his native country. His works found great favor in Russia, and in translation in Europe and the United States. He died in Moscow, March 4 (N. S.), 1852.

GOGRA (gog'rä), or **GHAGRA** (ghäg'rä), one of the largest affluents of the Ganges, joining that river from the N. at the town of Chapra, after a generally S. E. course of 600 miles. It rises in the higher Himalayas, passes through Nepal, and after reaching the level land becomes the great waterway of the Northwest provinces and Oudh. Its principal tributary is the Rapti, also of commercial importance.

GOIL, LOCH, a small but highly picturesque loch in Argyllshire, Scotland, a branch of Loch Long, 6 miles in length and less than 1 mile in breadth. Its shores are for the most part wild and rugged. The mountains in the neighborhood rise to the height of more than 2,000 feet. Lochgoilhead is a favorite watering-place.

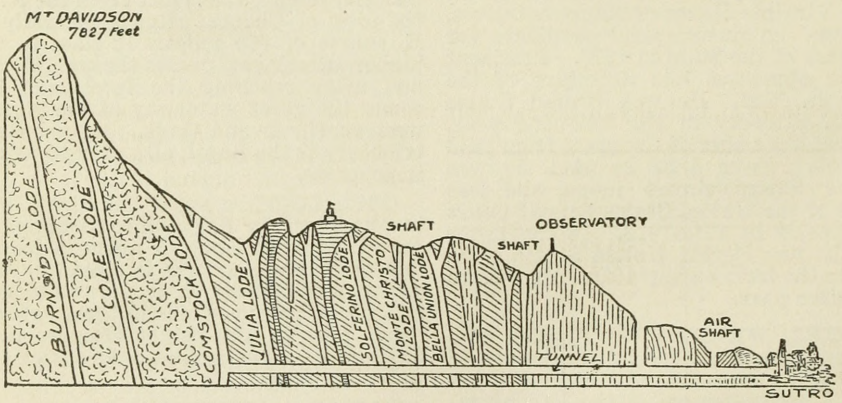
GOITER, or **GOITRE** (Latin, *guttur*= the throat), or Bronchocele. A disease which arises from a morbid enlargement of the thyroid gland, causing an unsightly, but painless, deformity. It is more common among women than among men, in the proportion of about 12 to 1. It prevails chiefly, if not exclusively, in villages situated on or close to limestone rocks.

GOJAM (gō-jäm'), a province of Abyssinia, lying S. of Lake Dembea; lat. 10° to 11° N., lon. 37° to 38° E. The surface is, in many portions, mountainous; in others it is diversified by hill and dale, affording good pastures, which are well watered by the various affluents of the Abai river.

GOLD, a triatomic metallic element, symbol Au; atomic weight, 196; specific gravity, 19.26; melting point about 1240° C., forming a green fluid which volatilizes at a higher temperature. Gold is a metal of a bright yellow color. It is very ductile; a grain of it can be drawn into a wire 50 feet long, and will gild two miles of fine silver wire. It is also very malleable; one grain can be beaten out to cover an area of 56.75 square inches. Gold does not oxidize or tarnish in the air, and is not acted upon by oxygen or water at any temperature; it is not dissolved by sulphuric, nitric, or hydrochloric acid, but is dissolved by aqua regia, a mixture of nitric and hydrochloric acids. Gold crystallizes in cubes, octahedra, and other forms belonging to a regular system. Gold forms two series of salts, aurous and auric; it has been detected in sea water. Gold can be purified by melting it along with borax in a clay crucible, glazed inside with borax, and passing chlorine gas through the melted metal by means of a tobacco pipe stem; the other metals are converted into chlorides, which rise to the surface. When the operation is finished, the gold is allowed to cool, and the fused chlorides poured off. Pure gold is prepared by dissolving the metal in a mixture of nitric and hydrochloric acids; the solution is evaporated to get rid of the nitric acid, then diluted with water and filtered; the gold is then precipitated by ferrous sulphate. $2AuCl_3 + 6FeSO_4 = Au_2 + Fe_2Cl_6 + 2Fe_2(SO_4)_3$. Pure gold is a very soft metal, therefore it is alloyed with silver, which gives it a greenish-yellow tint, or with copper, which gives it a yellowish-red color.

Pharmacy.—Gold has been used in medicine for scrofulous diseases and for chronic alcoholism. Gold terchloride is very poisonous, acting like corrosive sublimate. Gold leaf is used by dentists for filling teeth.

Mineralogy.—A metal crystallizing isometrically in octahedrons or dodecahedrons, as well as acicular, filiform, reticulated, arborescent, and spongiform shapes. There are four varieties, (1) Ordinary, and (2) Argentiferous gold or electrum, (3) Palladium gold or porpesite, (4) Rhodium gold. The gold product of the United States far exceeds that of any other land. Almost every State and Territory has yielded its share of the precious metal. By far the largest portions have come from California. Gold in Alaska was first reported by Tebenkof in 1848, but the first real important "find" was that of Joseph Juneau in 1880, near the site of the present town of Juneau. In August, 1896, J. F. Butler, a California miner, took out $10,000 in 10 days at a point 4 miles above Dawson. About the same time George W. Cormack discovered a rich field on the Klondike, in the Northwest Territory, reports of which caused a great rush to that region in 1897-1898. Within two months after the discovery, $5,000,000 were taken out. Though the Klondike region attracted the most attention, it is a very small portion of the gold-bearing region of Alaska and Canada. Colorado is also a rich gold-producing State. The largest gold production in the world is from the Transvaal, and other provinces of South Africa.



CROSS SECTION OF COMSTOCK LODE AT SUTRO, NEVADA

Geology.—Gold has been found in slate, quartzite, sandstone, limestone, granite, and serpentine. In many cases it occurs in veins of quartz, but much more accessibly in drifts, which the breaking up of those quartz veins has helped to produce. In the Ural Mountains the drift is Newer Pliocene; in

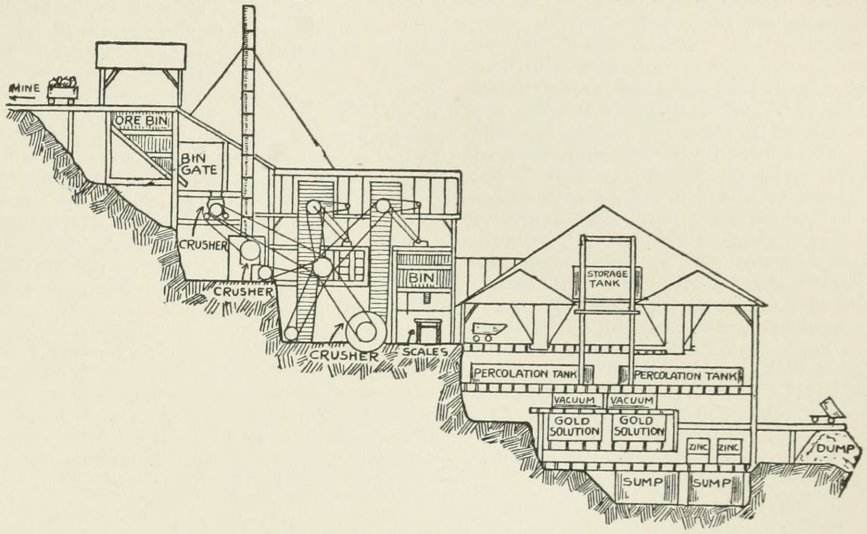
California it is of two different ages, but both, geologically viewed, comparatively recent; when in veins, it is more often found in the Palæozoic than in the Secondary or Tertiary strata. In most cases the veins are near plutonic rocks.

Production.—The following table shows the production of gold in the United States and Alaska in the calendar year 1920:

State or Territory	Gold	
	Fine ounces	Value
Alaska	481,984	$9,963,500
Arizona	222,965	4,609,100
California	841,638	17,398,200
Colorado	495,810	10,249,300
Georgia	34	700
Idaho	34,085	704,600
Illinois	0	0
Maine	10	200
Michigan	0	0
Missouri	14	300
Montana	116,918	2,416,900
Nevada	225,384	4,659,100
New Mexico	28,319	585,400
North Carolina	5	100
Oregon	53,029	1,096,200
Philippine Islands	41,119	850,000
South Carolina	5	100
South Dakota	255,889	5,289,700
Tennessee	271	5,600
Texas	19	400
Utah	109,661	2,266,900
Vermont	19	400
Virginia	0	0
Washington	11,436	236,400
Wyoming	14	300
	2,918,628	$60,333,400

The value of the gold production of the world in 1920 was $365,166,077, divided as follows: North America, $91,440,724; Central and South America, $14,112,305; Europe, $12,801,506; Australasia, $23,618,690; Africa, $193,780,666.

History.—Gold is mentioned in the Bible as early as Gen. ii: 12. The Hebrew word is *zahab*, from *zahab* = to shine, to be brilliant. As the names of gold in the Aryan languages (Latin *aurum*, Greek *chrysos*,) differ from this, gold may perhaps not have been discovered till after the separation of the Aryan and Semitic races. Gold was first coined in England in 1257.



CROSS SECTION OF CYANIDE PLANT

GOLD AMALGAM, a mineral composed of mercury, 57.40; gold, 38.39; and silver, 5. It is found in Colombia in white grains about the size of a pea, and in California in yellowish-white, four-sided prisms.

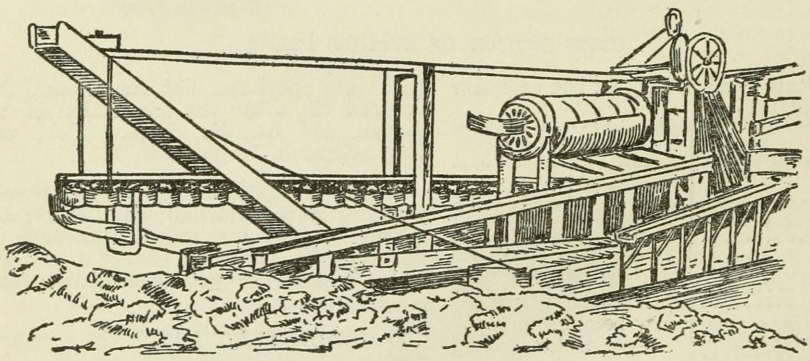
GOLDBEATER'S SKIN, the prepared peritoneal membrane of the cæcum of the ox. It is used to separate the leaves of gold while under the hammer; thus it is reduced to extreme thinness, and in this state is used as an application to cuts and wounds. Its manufacture is extremely offensive.

GOLDBERG (gōld'berg), a town of Prussian Silesia, on the Katzbach, 13 miles W. S. W. of Liegnitz. It owes both origin and name to its former rich gold mines; suffered much from Mongols and Hussites, the Thirty Years' War, the campaign of 1813, and finally from great fires (1863-1874); and now has manufactures of cloth, flannel, etc. Pop. about 7,000.

GOLD COAST. See GUINEA.

GOLD COAST COLONY, a British crown colony on the coast of west Africa. Coast line about 350 miles; area about 80,000 square miles; pop. about 1,604,000, of whom about 500 are Europeans. The native state of Ashanti lies inland, at the back of the central portion of the colony and is now included in British Gold Coast Territories. The products are chiefly palm oil, gold, palm kernels, rubber, timber, etc. Chief town, Accra.

Trouble arose between the King of Kumassi, who had declared himself King of Ashanti in 1894, and the British authorities and in 1895 an expedition was sent against him, under the command of Sir Francis Scott, which resulted in the submission of the king, who was afterward taken to the coast. The kings of Bekwai and Abodom also made their submission, and the country was placed under British protection, and a resident appointed at Kumassi. The Niger Convention drawn up by the Anglo-French Commission sitting at Paris, and signed June 15, 1898, settled the boundaries of the *hinterland* to the W. and the N. Bona and Dokta were given up to France, and the French had to concede Wa and other points to the E. of the Volta which had been occupied by them.



GOLD DREDGE

GOLDEN BAY, the Bay of Rieselarke, so named because its sands glitter like gold.

GOLDEN BEETLE, the name popularly given to many members of a genus of coleopterous insects, *Chrysomela*, and of a sub-family, *Chrysomelinæ*, belonging to the tetramerous section of the order. The body is generally short and convex, some of the species are destitute of wings. None are of large size, but many are distinguished by their metallic splendor of color. The finest species are tropical, but some are found in Britain—*e. g.*, the golden *C. cerealis* with purple stripes found on Snowdon, and the brassy-green *C. polita* and *C. staphylea* commonly found on nettles in spring.

GOLDEN CHERSONESE, THE, the Malay Peninsula; so called by Ptolemy and Milton.

GOLDEN-CRESTED WREN or **GOLDEN-CRESTED REGULUS**, or **KINGLET** (*Regulus cristatus*), a beautiful bird belonging to the family *Sylviadæ*, distinguished by an orange crest. It is the smallest of British birds, being only about 3½ inches in length. The upper part of the body is yellowish olive green, all the under parts pale reddish-white, tinged with green. Its nest is most commonly open at the top, but sometimes it is covered with a dome, and has an opening on one side. It is always ingeniously suspended beneath the branch, being the only instance of the kind among the birds of Great Britain. The eggs are 9 or 10 in number.

GOLDEN EAGLE, or **RING-TAILED EAGLE**. a North American bird, *Aquila chrysaëtus*, sub-family *Aquilnæ*. It is 32 to 40 inches long, and the wing 35. The head and neck behind are light-brownish fulvous, the tail at base white, terminal portion glossy black, and all other parts purplish-brown. It has great power of flight, but not the speed of many of the falcons and hawks, but its keen sight enables it to spy an object of prey at a great distance, and with meteor-like swiftness and unerring aim it falls on its victim. The nest of the golden eagle is placed on a shelf of a rugged and generally inaccessible precipice. It is flat and very large, and consists of dry sticks. The eggs are two in number and dull white with undefined patches of brown. The golden eagle preys on fawns, hares, wild turkeys, and other large birds. It does not attain its full beauty of plumage till the 4th year.

The so-called ring-tailed eagle is the golden eagle before it has reached maturity. The European golden eagle is so nearly like the American one that there is a question whether it is not the same species.

GOLDEN-EYED FLY (*Chrysopa perla*), or **LACEWING FLY**, a neuropterous insect, common in Great Britain; pale green, with long thread-like antennæ, long gauze-like wings, and brilliant golden eyes. Its flight is feeble. The female attaches her eggs, in groups of 12 or 16, by long hair-like stalks, to leaves or twigs, where they have been mistaken for fungi. The larvæ are ferocious-looking, rough, with long hairs; they are called aphis lions, and are very useful in the destruction of aphides, on which they feed. The pupa is inclosed in a white silken cocoon. The general facts above stated are also true of another very common species (*Ch. vulgaris*)— a delicate green insect, with a body about half an inch long. The species of *Chrysopa* emit a very disagreeable odor. The nearly allied genus *Hemerobius* is also abundantly represented in Great Britain and elsewhere.

GOLDEN FLEECE, in classical mythology, the fleece of gold in quest of which Jason undertook the Argonautic expedition to Colchis. The fleece was suspended in an oak-tree in the grove of Ares (Mars), and was guarded by a dragon. When the Argonauts came to Colchis for the fleece, Medea put the dragon to sleep, and Jason carried the fleece away. See ARGONAUT; JASON; MEDEA.

GOLDEN FLEECE, ORDER OF THE, the Toison d'or, a military order instituted by Philip the Good, Duke of Burgundy, in 1429, on the occasion of his marriage with the Portuguese princess, Isabella. The order now belongs to both Austria and Spain. The knights carry suspended from their collars the figure of a sheep or fleece in gold.

GOLDEN GATE. a channel two miles wide, forming the entrance to the Bay of San Francisco, and washing the N. shore of the peninsula on which San Francisco is built. It is defended by Fort Point, at the N. W. extremity of the peninsula, and by a fort on Alcatraz Island, inside the entrance.

GOLDEN HORDE, originally the name of a powerful Mongol tribe, but afterward extended to all the followers of Genghis Khan, and of Batu, the grandson of Genghis Khan, who invaded Europe in the 13th century. Under Batu the Golden Horde advanced W. as far as the plain of Mosi in Hungary, and Liegnitz in Silesia, at both of which bloody battles were fought in 1241. They founded the empire of the Kiptshaks, or the Golden Horde, which extended from the banks of the Dniester to the Ural, and from the Black Sea and the Caspian to the mouth of the Kama and the sources of the Khoper. This empire lasted till toward the close of the 15th century, when it was overthrown by Ivan III.

GOLDEN HORN, the harbor of Constantinople, an inlet of the Bosporus, so called from its shape and beauty.

GOLDENROD (*Solidago*), a genus of *Compositæ*, closely allied to aster. Only the common *S. Virgaurea* is British, a few others are European, but most (more than 100) belong to North America, where their bright coloring lightens up the autumn scenery. Some—*e. g., S. canadensis, grandiflora, etc.*—are found in old-fashioned borders. *S. Virgaurea* had at one time a great reputation as a vulnerary. The leaves of this and a fragrant North American species, *S. odora*, have been used as a substitute for tea.

GOLDEN SAXIFRAGE, the popular name for plants of the genus *Chrysosplenium*, a small genus of *Saxifragaceæ*, consisting of annual or perennial rather succulent herbs, with alternate or opposite crenate leaves, and inconspicuous greenish axillary and terminal flowers. They are natives of central and northern Europe, the Himalayas, and parts of America.

GOLDEN TRUMPETER, a South American bird, the agami, which emits a deep, rough sound, suggesting that of a trumpet.

GOLDEN WASPS, one of the popular names for the hymenopterous genus *Chrysis*, or the family of which it is the type. They are not genuine wasps. The wasps proper have a sting, and the "golden wasps" only an ovipositor. See WASP.

GOLDEN WEDDING, the 50th anniversary of a wedding. The presents given to the couple should all be of gold.

GOLDFINCH, *Carduelis elegans*, a well-known bird belonging to the family *Fringillidæ*, and the sub-family *Fringillinæ*. Bill pale born colored, the tip black, the circumference at its base crimson, nape of the neck white; the top of the head, carpal portions of the wing, the smaller wing coverts, and part of the surface of the primaries black; back and rump dusky brown, greater wing coverts, and part of the expanse of the others, gamboge yellow; under surface of the

body dull white. The eggs are four or five, spotted with purple and brown.

GOLDFISH, the trivial name of a beautiful species of carp, found in the fresh waters of China. It is greenish in color in the natural state, the golden yellow color being found only in domesticated specimens, and retained by artificial selection. These fishes are reared by the Chinese and kept for ornament. They are now distributed over nearly all the civilized parts of the world.

GOLD FURNACE, a furnace for melting or reducing gold. It resembles a brass furnace, but is usually built above the floor, occupying one side or more of the shop, and appearing like a dwarf wall. The aperture for the fuel and crucible in each furnace is 9 to 16 inches square, and 11 to 20 inches deep. The crucibles are usually of black lead.

GOLD HILL, a former village of Nevada, 7,000 feet above the sea, and about a mile S. of Virginia City, to which it has been annexed. It has rich silver mines, and several quartz mills. Here, on Mount Davidson, is the famous Comstock lode.

GOLDLEAF, fine gold beaten into thin leaves. A small percentage of silver and copper is added to the gold for beating, about 1½ per cent. of alloy. The ingot is rolled into a ribbon by repeated passage between rollers, and this ribbon has a thickness of 1-800 of an inch, a surface of 500 square inches to an ounce of gold. It is then cut into pieces of about 1 inch square, placed between pieces of goldbeater's skin 4 inches square, and beaten with a ponderous hammer on a smooth marble slab till the gold has thinned and expanded to the size of the vellum. Each piece of gold is then again divided into 4, placed between pieces of goldbeater's skin as before, and again beaten till it expands to the size of the skin. A third and a fourth beating follow. An ounce of gold in the form of a cube, 5¼ lines in length, breadth, and thickness, can be so extended by the goldbeaters as to cover a surface of more than 1,466½ square feet.

Wood, plaster, papier-maché, and many other substances may be gilded by covering them with goldleaf stuck on with a kind of sizing or glue. The gold leaf is not put on the wood, plaster, etc., itself, but on a mixture of whiting and glue called size. In gilding picture frames, for example, the wood is painted with four or five coats of size put on hot. This is carefully smoothed, when dry, with pumice stone and fine sandpaper, and another size, made of clay, red chalk, black lead, suet, etc., is then put on. This, which is called gold size, is the groundwork for the gold leaf. In gilding on metals or surfaces to be much in the open air an oil size is used.

GOLDMAN, EMMA, an American anarchist; born in Russia about 1868; emigrated to the United States and joined various anarchist societies; was arrested several times, and imprisoned for a year in New York City because of her destructive teachings. According to CZOLGOSZ (*q. v.*) her speeches incited him to assassinate President McKinley. In 1917 she was arrested for conspiracy and sentenced to two years' imprisonment and to pay a fine of $10,000. She appealed to U. S. Supreme Court, which confirmed the sentence in January, 1918. In February of that year she began her term in the prison at Jefferson City, Mo. Under the Alien law a second conviction for conspiracy carries with it the sentence of deportation and she was shipped to Russia with other Anarchists in 1920.

GOLDMARK, KARL, an Austro-Hungarian composer; born of Jewish parents in Keszthely, Hungary, May 18, 1832. He resided in Vienna. He became known in the United States by his operas, "The Queen of Sheba" and "Merlin," which was performed for the first time on any stage at the Metropolitan Opera House, New York, in 1887, and by the very effective overtures, "Sakuntala" and "Penthesilea." The "Country Wedding" symphony is a great favorite. He died in 1915.

GOLD OF PLEASURE (*Camelina*), a small genus of *Cruciferæ*. The common gold of pleasure (*C. sativa*) is an annual plant of humble appearance, but with abundant yellow flowers. It is most commonly known as a weed in lint fields, though it is also cultivated alone or mixed with rapeseed in parts of Germany, Belgium, and the S. of Europe for the sake of the abundant oil contained in its seeds. Its seeds and oil cake are, however, inferior to those of lint, and its oil is apt to become rancid and is less valued than that of rape or colza. The crop is cut or pulled when the pouches begin to turn yellow. The stems are tough, fibrous, and durable, and are used for thatching and for making brooms; their fiber is sometimes made into very coarse cloth and packing-paper. The seeds are used for emollient poultices. *C. dentata* is of similar habit and properties, but is not cultivated.

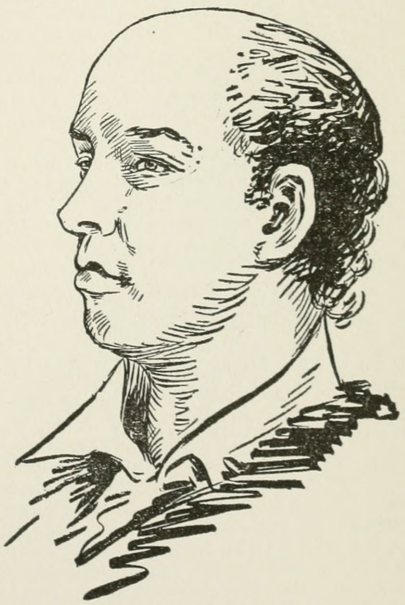
GOLDONI, CARLO (gol-dō′nē), a celebrated Italian writer of comedies; born in Venice, Italy, Feb. 25, 1707. He early showed a taste for theatrical representations. A relative procured for him a place in the Papal College at the Uni-

versity of Pavia, from which he was expelled for writing scurrilous satires. After his father's death he settled as an advocate in Venice, but shortly took to a wandering life with strolling players, till in 1736 he married the daughter of a notary and settled down in Venice. Here he first began to cultivate that department of dramatic poetry in which he was to excel; namely description of character and manners. In this he took Molière for his model. For five years he visited various cities of Italy, composing pieces for different theatrical companies, and for a time renewing his legal practice. In 1761 the Italian players invited him to Paris, where many of his pieces met with uncommon applause. He became reader and master of the Italian language to the daughters of Louis XV.; and received latterly a pension of 3,600 livres. At the breaking out of the revolution the poet lost his pension, and the decree of the National Convention of Jan. 7, 1793, restoring it and making up the arrears found him on his death-bed. His widow received the pension for herself. Many of his pieces still appear on the stage. He died in Paris, France, Jan. 6, 1793.

GOLDSBORO, a city of North Carolina, the county seat of Wayne co. It is on the Southern, the Atlantic Coast Line, and the Norfolk Southern railroads, and on the Neuse river. It is the center of an important agricultural and cotton-growing region. It has also extensive industries, including the manufacture of cotton, oil, lumber, rice, furniture, agricultural implements, brick, woolen goods, etc. Its public institutions include a park, an Odd Fellows' Orphan Home, the Eastern Insane Asylum, a hospital, and a sanitarium. Pop. (1910) 6,107; (1920) 11,296.

GOLDSCHMIDT, MADAME (gōld' shmit), maiden name JENNY LIND, a famous Swedish vocalist; born in Stockholm, Sweden, Oct. 6, 1820. At 3 years of age she could sing correctly any piece she had once heard, and at 9 she was placed under Croelius, a famous teacher of music. Count Pücke, manager of the court theater, after hearing her sing, caused her name at once to be entered at the Musical Academy, where she made rapid progress. She acted repeatedly in children's parts on the Stockholm stage till her 12th year, when her upper notes lost their sweetness. For four years she studied music theoretically. Her voice having recovered, she appeared at the Royal Theater, Stockholm, as Agatha, in "Der Freischütz," in 1838, and for 1½ years she continued the star of the opera at Stockholm. A series of concerts in the principal towns of Norway and Sweden gave her the means to study in Paris under Garcia. Declining Meyerbeer's offer to go to Berlin, she returned to her native city, where she enjoyed a great triumph on her reappearance. In 1844 she went to Dresden, and afterward to Frankfort, Cologne, and Vienna. She first appeared before a London audience in May, 1847, as Alice, in "Robert the Devil," followed by a series of unparalleled triumphs in "Sonnambula," "The Daughter of the Regiment," "Puritani," etc. She visited New York in 1850, under the auspices of P. T. Barnum, and was enthusiastically received, but dissolved the engagement prematurely in 1851, was married to M. Otto Goldschmidt, a skillful pianist and conductor, and retired from the stage. She reappeared in 1855, in 1861, in 1863, and in 1880, for a limited period. She was Professor of Singing at the Royal College of Music, 1883-1886. She died in Wynd's Point, Malvern, England, Nov. 2, 1887.

GOLDSMITH, OLIVER, a famous English author; born in Pallas, Longford co., Ireland, Nov. 10, 1728. In 1745 he entered Trinity College, Dublin,



OLIVER GOLDSMITH

where he gave no indications of genius or scholastic talents, and becoming involved in some youthful irregularities, quitted the university, and led for some time a sort of vagrant life. Returning to

college, he was graduated B. A. in 1749, after which he proceeded to Edinburgh and Leyden universities to study medicine. He set out on foot for a tour of the European continent, supplied with no other means than those afforded by his good spirits, and a favorite flute. After taking his degree in medicine at Padua, he returned to England in 1756, where he commenced practice as a physician, in which he was unsuccessful. He then entered the field of letters; and after passing a period of obscurity and privation as a "bookseller's hack," his first work to attract attention was an "Inquiry Into the Present State of Polite Learning in Europe" (1759). To this succeeded "The Citizen of the World," a "Life of Beau Nash," and a "History of England." Becoming acquainted with Dr. Johnson, in 1761, the latter introduced Goldsmith to the Literary Club. In 1764 appeared "The Traveler," which at once placed Goldsmith in the front rank of English authors. Two years afterward appeared the "Vicar of Wakefield." Following in rapid succession came "The Good-natured Man" (1767), "History of Rome" (1768), and his exquisite poem, "The Deserted Village" (1769). In 1773, his immortal comedy of "She Stoops to Conquer" took the public by storm. His other works are "Grecian History" (1774), "Retaliation," a serio-comic poem (1774), and "History of Animated Nature," which he did not live to finish. He died in London April 4, 1774.

GOLD TOOLING, in bookbinding, ornaments impressed by the hot tool on gold-leaf laid on book-covers, causing the metal to adhere. In contradistinction to blind tooling, which is the tool mark without the leaf.

GOLETTA, the port of the city of Tunis, from which it is 11 miles N. In the new quarter are the bey's palace, a large dock, and an arsenal defended by a battery. Pop. usually about 3,000, trebled during the visit of the bey in the bathing season.

GOLF, a game of ball, in which the bats are loaded sticks with a little curve at the end for striking the ball on the ground, or elevated on a little mound, or tee, as it is called in the language of the game. Golf clubs are of varying weights and forms, according to the taste and requirements of the players. The balls are made of composition.

Golf is identified with Scotland, by reason of its great popularity in that country for upward of 500 years. As early as 1457 the Scotch Parliament felt called on to discourage golf because the absorbing interest of the people in the game diverted attention from the more warlike sport of archery, and diminished the power of the people to preserve their national independence. The source of the game is generally admitted to be Dutch.

It may be played on any good stretch of meadow where the grass is not too rank, but the ground best suited for the purpose is a reach of undulating country with a sandy soil, short, crisp turf, and plenty of holes or ruts. The latter, which form the bunkers or obstacles, are necessary to prevent the game from being too easy. The course, called "links," should not be less than 3 miles round nor more than 5. Throughout it are distributed 18 artificial holes at any distance from 1 to 500 yards apart. The holes are 4½ inches in diameter, and each is surrounded with a "putting green," a space 60 feet square and as smooth as possible. The other requisites are two small balls about two inches in diameter and made of gutta-percha, and a number of "clubs" adapted to the various contingencies likely to arise. The object of the game is to knock the ball with the sticks into the series of holes in the least number of strokes. The game can be played either by two persons, each having his own ball and counting by holes, not by the strokes taken for the whole round—this is called singles, or foursomes, two persons playing against another two, the partners playing alternate strokes, each side having its own ball. At the beginning of the game the player puts a little pat of sand down on the "teeing ground" (the pat is the "tee"), sets the ball on the top, and strikes it as far as he can in the direction of the first hole. After that, until he holes the ball, he must play it strictly from the place it happens to be. Here is where the bunkers come in, for a ball may land in a ditch or under a bank, where it may take him many strokes to get it into open ground again, and he may be called upon to use many different kinds of clubs, according to the nature of the ground and his distance from his object. The object of the putting green which surrounds the hole is to give the player a smooth space, enabling him to aim with accuracy. Having "holed" his ball, the player takes it out, tees it again, and starts out for the next hole. A good driving stroke from a tee would be 200 yards. But a record of 280 yards has been made at St. Andrews, Scotland.

There are two styles of clubs, the wood and the iron, the latter having the head shod with steel. Altogether there

are 19 shapes of clubs, but six are usually sufficient for a man's needs. The different clubs are used under different circumstances; for example, a putter for playing short strokes on the putting green; a cleek for drives; the driving iron when it is advisable to make a long drive, lifting the ball moderately high, the lifting iron when it is required to pitch the ball very high; the niblic for raising a ball out of ruts; the driver for long drives from a tee.

GOLIATH (gō-lī'ath), a giant of Gath slain by David (1 Sam. xvii.). His height was "six cubits and a span," which, taking the cubit at 21 inches, would make him a little over 11 feet. The Septuagint and Josephus read, "four cubits and a span."

GOLIATH BEETLE (*Goliathus*), a genus of tropical lamellicorn beetles, in the subfamily *Cetoniidæ*. They are distinguished by their large size, by the horny processes on the heads of the males, and by the toothed lower jaws or maxillæ. Several species frequent tropical and south Africa, and related genera occur in tropical Asia. The male of the largest form, *G. druryi*, from the Gold Coast, measures about four inches in length. In color, as well as size, these goliaths and their relatives are splendid insects. The family *Cetoniidæ* is familiarly represented in Europe and Great Britain by the rosechafer (*Cetonia aurata*).

GOLITZINE, NICHOLAS, PRINCE, a Russian statesman, member of an illustrious Russian noble family, born in Wiesbaden, Prussia. He was known as one of the most reactionary supporters of the Czarist Government. In the fall of 1916, when the Duma demanded a more responsible form of government, Trepoff, then Premier, was forced to resign, and was succeeded by Golitzine as Premier. Golitzine, however, played entirely a subordinate part to that of the Minister of the Interior, Protopopoff, the latter being responsible for the activities of the Cabinet, which finally led to the revolution of March, 1917.

GOLOMYNKA (*Comephorus* or *Callionymus baikalensis*), a remarkable fish, found only in Lake Baikal, the only known species of its genus. It is about a foot long, is destitute of scales, and is very soft, its whole substance abounding in oil, which is obtained from it by pressure.

GOLT-SCHUT, a name colloquially used for a small ingot of gold. Also an itzebu; a silver coin in Japan, worth 44 cents.

GOLTZ, KOLMAR, BARON VON DER, a German soldier, born in Bielkenfeld, East Prussia, and educated in the Military Academy in Berlin. He saw his first military service in the war between Austria and Prussia in 1866 and also participated in the Franco-Prussian War, after which he was appointed instructor in the Berlin Military Academy. In 1883 he entered the service of the Turkish Government as chief of military education, in which position he continued until 1896. After this he re-entered the German military service, becoming a lieutenant-general in 1908, when he again went to Turkey to superintend the reorganization of the Turkish Army. When the World War broke out, in 1914, he was back in Germany, and, after the German invasion of Belgium, was appointed military governor of the conquered territory, but in November, 1914, he was sent back to Turkey, where he was appointed military commandant of the capital and acting Minister of War. He was chiefly responsible for the excellent defenses erected on the Gallipoli Peninsula and the defeat of the Allied expedition there. In April, 1915, he succeeded Simon von Sanders as chief of the First Turkish Army.

GOMATO (gō-mä'tō), or **GOMUTI** (gō-mö'tē) **PALM,** the *Saguerus saccharifier*, or *Areng*, a species of trees found in the Moluccas and Philippines, which supplies abundance of sugar. Palm sugar is generally obtained from the juice which flows from different palms on wounding their spathes and adjacent parts. It is commonly known in India by the name of jaggery. The juice of the gomuti palm, when fermented, produces an intoxicating liquid or toddy. In Sumatra it is termed neva, and a kind of arrak is distilled from it in Batavia. From the trunk of this palm, when exhausted of its saccharine juice, a good deal of our commercial sago is obtained. A single tree will yield from 150 to 200 pounds of sago. The stiff strong fiber known under the name of gommuti, or ejow fiber, is obtained from the leaf-stalks, and is extensively used in the manufacture of cables and various kinds of rope.

GOMERA, one of the Canary Islands.

GOMEZ, JOSÉ MIGUEL, a Cuban soldier and politician, born in the province of Santa Clara in 1846. He served during the Ten Years' War from 1868 to 1879 and took an active part in the revolution of 1905, rising to the rank of major-general. He was governor of the province of Santa Clara during the First American Intervention and served in the

same position under the presidency of Estrada Palma. He was a candidate for the presidency in 1905 but withdrew prior to the election. He was arrested in 1906 on the charge of attempting to foment a revolution, and he remained in prison until the Second American Intervention. He was elected President of the Republic in 1908. His administration was marked by financial and economic difficulties and there were charges of corruption on the part of the administration. A revolution broke out in 1912 which was crushed. In the following year President Gomez retired from office. He was again a candidate for the presidency in 1920, but was defeated by Alfredo Zayas.

GOMEZ, MAXIMO (gō'meth), a Cuban military officer; born in Bani, San Domingo, in 1838; served as a lieutenant of cavalry in the last Spanish army sent to occupy that island. During the war with Haiti he won distinction at the battle of San Tome, in which action at the head of 20 men he conquered a much superior number. When the freedom of San Domingo was declared he accompanied the Spanish force to Cuba; but later, when General Villar maltreated some Cuban refugees, he became angry, and after personally assaulting that officer left the Spanish army. In 1868 he joined the Cuban insurrection known as the Ten Years' War. He aided in the capture of Jugnani, Bayamo, Tunas, and Holguin, and was a leading actor in many other successful engagements; was promoted Major-General and later succeeded General Agramonte as commander-in-chief. At the beginning of the war of 1895-1898 he again took up arms with the Cubans and fought with marked distinction till the Americans occupied Cuba. On Feb. 25, 1899, after marching through Havana with 2,500 of his soldiers, he was given a reception and banquet in that city by the United States military authorities. Later he was of invaluable service to General Brooke, the American governor-general, in the work of reconstruction on the island. In 1900-1901 he was conspicuously mentioned for the presidency of the Cuban republic. Among his sketches are "Panchito Gomez" and "Mi Escolta." He died June 17, 1905, at Havana.

GOMPERS, SAMUEL, an American labor leader, born in London, England, Jan. 27, 1850. He was apprenticed to a cigar maker as a young boy and came to the United States in 1863. In spite of his youth he became in the following year, 1864, the first registered member of the Cigar Makers' International Union, serving later as its secretary and president and making it one of most successful of all American trade unions. He was one of the founders of the AMERICAN FEDERATION OF LABOR (*q. v.*), and the editor of its official magazine. In 1881 he was elected its vice-president, and from 1882 on he was annually elected president with the single exception of 1894, in which year he was defeated by John McBride. Under his influence and direction the American Federation of Labor became one of the most powerful and successful labor organizations in the world. Gompers, though sponsoring and supporting many movements and measures in favor of and for the improvement of labor, has consistently thrown his influence toward the conservative elements of American labor. His opposition to socialistic tendencies



SAMUEL GOMPERS

within the ranks of American trade unionists has been outspoken and unfaltering. In 1907 he came into special prominence, together with other officers of the American Federation of Labor, for failing to observe an injunction granted to the Buck Stove and Range Company in the latter's complaint against the Federation for having been included in the list of unfair concerns published in the official magazine of the Federation. Mr. Gompers was tried for contempt and sentenced to a term of prison. Repeated appeals eventually brought the matter before the Supreme Court of the United States in 1914, when this court decided that the statute of limitations made

further actions impossible. As the president of the American Federation of Labor, he was, of course, identified with, and, indeed, frequently initiated this organization's policies, as in respect to the eight-hour day, employers' liability laws, etc. He has tried at various times, but without any marked degree of success, to control the labor vote on behalf of candidates favorable to labor. During the World War he was a member of the Advisory Commission of the Council of National Defense. At the Peace Conference in Paris in 1918-1919 he acted as the representative of the American Federation of Labor. At the same time he served as president of the International Commission on Labor Legislation. In 1919 he was the chairman of the delegation from the American Federation of Labor to the convention of the International Federation of Trades Unions at Amsterdam. He also served as 1st vice-president of the National Civic Federation. He published "Labor in Europe and America"; "American Labor and the War"; "Labor and the Common Welfare," as well as numerous pamphlets on labor questions and movements.

GONAÏVES, a harbor on the west coast of the Island of Haiti, 67 miles N. W. of Port-au-Prince. It was here that the independence of the Republic of Haiti was proclaimed in 1804 by Dessalines. In 1914 it was the center of heavy fighting between the insurgents and the government, which resulted in temporary occupation of the country by the United States naval forces. The population is about 15,500.

GONCOURT, EDMOND and **JULES DE**, French novelists and brothers; the former born in Nancy, France, May 26, 1822, the latter in Paris, Dec. 17, 1830. They became celebrated as the joint authors of a number of famous writings, including "History of the French Society During the Revolution and Under the Directory" (1865); "Well-Known Portraits of the Eighteenth Century" (1878); "History of Marie Antoinette" (1858); "The Mistresses of Louis XV." (1860); "The Art of the Eighteenth Century" (1874); "Ideas and Sensations" (1866), etc. Jules died in Auteuil, June 20, 1896; Edmond in 1870.

GONDAR (gon'där), the capital of Amhara, in Abyssinia, on a basaltic hill 23 miles N. of Lake Tzana. It was formerly the residence of the emperor, and at one time had about 50,000 inhabitants. The hill is crowned by the ruin of the old castle, built by Indian architects under Portuguese direction; burned by Theodore in 1867, and now left to the bats and hyenas.

GONOLOBUS (nol'-) the typical genus of the tribe *Gonolobeæ*. It consists of twining or shrubby plants, common in the United States, with racemes, or corymbs of greenish or dingy purple flowers. About 60 species are known. The juice of *G. macrophyllus* is said to be used by the North American Indians to poison their arrows.

GONSALVO, or GONZALVO OF CORDOVA, HERNANDEZ Y AGUILAR, a Spanish general, called "The Great Captain"; born near Cordova, Spain, March 16, 1453. He was of noble family, and at an early age entered the army. He first distinguished himself in the great war of Ferdinand and Isabella with the Moors, which ended with the conquest of Granada in 1492. His next achievement was the recovery of the kingdom of Naples from the French, who conquered it under Charles VIII. in 1495. When Louis XII. renewed the invasion of Italy, Gonsalvo was again sent there, and, after a temporary division of the country between France and Spain, he again expelled the French, established the Spanish rule, and was named viceroy of Naples. Through the jealousy of Ferdinand, and the calumnies of the courtiers, he was deprived of his office in 1507, when he retired to Granada, and died there Dec. 2, 1515.

GONVILLE AND CAIUS (kēz) **COLLEGE**, a college of Cambridge University, England, founded in 1348 by Edmund Gonville, of Terrington, Norfolk. In 1558 Dr. Caius obtained the royal charter by which all the former foundations were confirmed and his own foundation was established. By this charter the college was thenceforth to be called Gonville and Caius College.

GONZAGA (gon-zä'gä), a princely family which gave a line of dukes to Mantua and Montferrat. The sway of this race over Mantua extended over a period of three centuries. The Gonzagas gradually monopolized all the chief posts of command, both civil and military; in 1432 they were invested with the title and jurisdiction of hereditary marquises, and in 1530 with that of dukes or sovereigns of the state. The house of Gonzaga and that of the Visconti Dukes of Milan were perpetually at war. The marquisate was granted to Giovanni Francesco in 1433. The 10th and last Duke of Mantua, Ferdinando Carlo, who had countenanced the French in the War of the Succession, was deprived by the Emperor Joseph I. of his states, and placed under the ban of the empire. He died in exile in 1708, leaving no issue. A branch of the family ruled Guastalla till 1746.

GOOD HOPE, CAPE OF, the cape at the S. end of the narrow peninsula running S. from Cape Town, South Africa. The name is a translation of the Portuguese *Cabo da Boa Esperança*, the name given by King John II., of Portugal, because its doubling in 1487 by Bartholomew Diaz, who called it *Cabo Tormentoso*, or Stormy Cape, afforded good hope of the discovery of the long-sought-for sea-way to India.

GOODNOW, FRANK JOHNSON, an American economist and educator; born in Brooklyn, N. Y., in 1859. He graduated from Amherst College in 1879 and took post-graduate studies at Columbia and in Paris. He was on the faculty of Columbia University and professor of law and political science from 1883 to 1907. In 1913-1914 he acted as legal adviser to the Chinese Government. He was appointed president of Johns Hopkins University in the latter year. His published writings include "Municipal Problems" (1897); "City Government in the United States" (1904); "Municipal Government" (1910); "Social Reform and the Constitution" (1911). He also edited many works on the Constitution and Government. He was a member of many learned societies.

GOODRICH, CASPAR FREDERICK, an American naval officer; born in Philadelphia in 1847. He graduated from the United States Naval Academy in 1864. He was appointed ensign in 1866. He saw service during the Civil War, and served on several naval vessels from 1865 to 1871, when he again attended the Naval Academy. He commanded a detachment of sailors and marines, landed at Alexandria in 1882 to police the burning city, and during the same year he was naval attaché on the staff of Sir Garnet Wolseley during the Tel-el-Kebir campaign. In 1884 he brought the Greeley relief ship "Alert" to New York. After serving on special duty he was appointed president of the Naval War College in 1897-1898. During the Spanish-American War he commanded the "St. Louis" and "Newark" and the "Iowa." In 1905-1906 he was commander-in-chief of the Pacific squadron, and from 1907 to 1909 he was commandant of the Navy Yard in New York. He was retired in 1909. In 1918-1919 he was commandant of the Naval Unit of Princeton University. From 1914 to 1916 he was president of the Naval History Society.

GOODRICH, SAMUEL GRISWOLD, pseudonym PETER PARLEY, an American author; born in Ridgefield, Conn., Aug. 19, 1793. He edited the "Token," published in Boston from 1828 till 1842. From 1841 till 1854 he edited "Merry's Museum and Parley's Magazine." His "Peter Parley" books won great popularity. Among the 200 volumes published by him are: "The Poetical Works of John Trumbull" (1820); "Tales of Peter Parley About America" (1827); similar books on Europe, Asia, Africa, and other countries. He died in New York City, May 9, 1860.

GOODWIN, MAUD WILDER, an American writer; born in Ballston Spa, N. Y., in 1856. Her novels include "The Colonial Cavalier"; "White Aprons"; "Sir Christopher"; "Veronica Playfair." She wrote "Dutch and English on the Hudson," and was a co-editor of "Historic New York."

GOODWIN, WILLIAM WATSON, an American educator; born in Concord, Mass., May 9, 1831; was graduated at Harvard College in 1851; became Professor of Greek Literature in Harvard in 1860-1901. He is the author of "Syntax of the Moods and Tenses of the Greek Verb"; "Greek Grammar"; etc. He died in 1912.

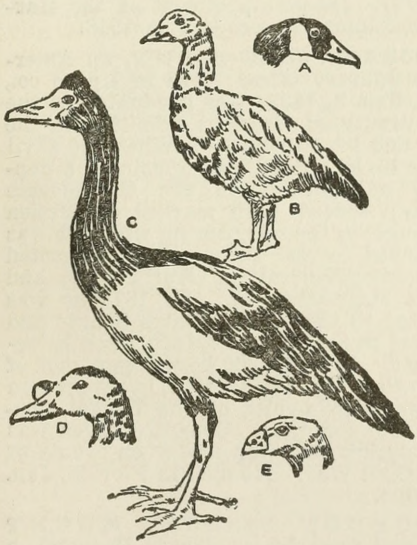
GOODYEAR, CHARLES, an American inventor; born in New Haven, Conn., Dec. 29, 1800. He failed as an iron manufacturer in 1830, but in 1834 turned his attention to india-rubber, the manufactured products of which had hitherto proved failures because of their liability to soften in the heat of summer. Amid poverty and ridicule, sometimes in prison for debt, he patiently pursued the experiments which, after he had obtained a fresh idea from his assistant Hayward's use of sulphur, ended, in 1844, in the issue of his patent for vulcanized rubber. This process he afterward perfected. It required 60 patents to secure his inventions. He received medals at London (1851) and Paris (1855), as well as the cross of the Legion of Honor; though kept in continual litigation and consequent poverty by shameless infringements of his rights, he yet lived to see his material applied to nearly 500 uses. He died in New York City, July 1, 1860.

GOONASS PASS, a pass in Bussahir, across the S. range of the Himalaya, 16,000 feet above the sea.

GOORKHAS, or **GURKHAS**, the dominant race in Nepal, descended from Hindu immigrants and claiming a Rajput origin. They overran the Khatmandu valley, and extended their power over Nepal in 1767-1768. Their advance S. led to the Nepal or Goorkha War of 1814-1815, and General Ochterlony's spirited campaign brought about the treaty of Segauli, which still defines English relations with Nepal, and which ceded various tracts in the Himalayas.

The Goorkhas, who are a short, thick-set race, are brave and faithful soldiers, and lent valuable aid to the British in the suppression of the mutiny and subsequently. They also fought in the World War. Goorkha, or Gurkha, is about 53 miles from Khatmandu, the present capital of Nepal. It was formerly the chief town. See NEPAL.

GOOSE, a tailor's smoothing and pressing iron, from the handle being like the neck of a goose. Also a game of chance played on a card divided into small compartments, numbered from 1 to 62, and arranged in a spiral form round an open central space. It was played by two or more persons, who moved their counters over the compartments according to the numbers which they threw on dice. In ornithology, any bird of the genus *Anser*. The domestic goose is believed to have descended from *Anser ferus*, called in books the greylag goose. It is valued for the table and on account of its quills and fine soft feathers. Geese=*Anserinæ*, a sub-family of *Anatidæ* (ducks). The body is large and heavy, the neck long, the head small, and the bill conical,

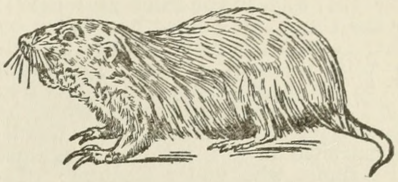


GOOSE

A. Head of Canadian Goose
B. Snow Goose
C. Half Webbed Goose
D. Rough Billed Goose
E. Cape Barren Goose

the wings long and powerful. In summer they inhabit the polar regions, migrating S. in flocks on the approach of winter.

GOPHER, a name given by the early French settlers in the United States to various animals which honeycomb the ground by burrowing in it. In Canada and Illinois it was given to a gray burrowing squirrel, *Spermophilus Franklini*, W. of the Mississippi to S. *Richardsonii*, in Wisconsin to a striped squirrel, and in Missouri to a burrowing pouched rat, *Geomys bursarius*. All these are



GOPHER

mammals; but in Georgia the term was applied to a snake, *Coluber coupen*, and in Florida to a turtle, *Testudo polyphemus*.

GÖPPINGEN, a town in Württemberg, Germany, situated on the Fils, 26 miles by rail from Stuttgart. It is noted for its production of textile goods, toys, agricultural machinery, and enameled ware. Pop. about 25,000.

GORAKHPUR, a division of the United provinces of Agra and Oudh, British India, with an area of about 10,000 square miles and a population of about 7,000,000. Lying along the southern slopes of the Himalayas, it is mountainous in character and thickly covered by forests. Cotton and rice are the chief productions. The city of Gorakhpur is the capital of the district; it is situated on the Rupti river, 100 miles N. E. of Benares. Pop. about 60,000.

GORDIANUS (ī-ā′nus) **I., MARCUS ANTONIUS**, surnamed Africanus; Roman emperor; born about 158 A. D. He was descended by the father's side from the famous family of the Gracchi. After being ædile, he twice filled the office of consul. He was then appointed proconsul of Africa. The tyranny and injustice of the Emperor Maximinus at length excited a rebellion in Africa, the authors of which proclaimed Gordianus emperor, though he was then (238) in his 80th year. At the same time his son was conjoined with him in the exercise of imperial authority. The younger Gordianus, however, was defeated and slain in battle by Capellianus, viceroy of Mauritania, before Carthage, whereupon his father put an end to his own existence (having been emperor for little more than a month) in 238.

GORDIANUS II., MARCUS ANTONIUS, Roman emperor, son and associate of the preceding; born in

192 A. D. He died near Carthage, Africa, in 238.

GORDIANUS III., MARCUS ANTONIUS PIUS, Roman emperor, grandson of Gordianus I.; born about 224 A. D. He was raised to the dignity of Cæsar with Pupienus and Balbinus, who were also elected emperors in opposition to Maximinus; and, in the same year (238), after the three last named had fallen by the hands of their own soldiers, Gordianus was elevated by the Prætorian bands to the rank of Augustus. Assisted by his father-in-law, Misitheus, whom he made prefect of the Prætorians, Gordianus marched in 242 into Asia against the Persians, who under Shahpûr (Sapor) had taken possession of Mesopotamia and had advanced into Syria. He relieved Antioch, which was threatened by them; drove back the Persians beyond the Euphrates; and was just about to march into their country when Misitheus died. Philip the Arabian, who succeeded Misitheus, stirred up the soldiery to assassinate the emperor in 244.

GORDON, CHARLES GEORGE, called "Chinese Gordon" and "Gordon Pasha," an English soldier; born in Woolwich, England, Jan. 28, 1833. He entered the Royal Engineers in 1852, and served in the Crimea (1854-1856). The Taeping rebellion in China he completely crushed by means of a specially trained corps of Chinese. On his return to England with the rank of colonel, he was appointed chief engineer officer at Gravesend. From 1874 to 1879 he was governor of the Sudan under the khedive. For a few months in 1882 he held an appointment at the Cape, and had just accepted a mission to the Kongo from the King of the Belgians when he was sent to withdraw the garrisons in the Sudan, which were at the mercy of the insurgent mahdi. He was shut up in Khartum by the rebels, and gallantly held that town for a whole year. A British expeditionary force under Lord Wolseley was dispatched for his relief; an advance corps of which sighted Khartum, Jan. 24, 1885, to find that the town had been treacherously delivered into the hands of the mahdi two days before, and Gordon murdered. His character was marked by strong religious feelings, which made him somewhat of a fatalist.

GORDON, CHARLES WILLIAM, a Canadian author, writing under the name "Ralph Connor"; born in Indian Lands, Glengarry, Ont., Canada, in 1860. He was graduated at Toronto University in 1883 and at Knox College in 1887; was a missionary to Banff, etc., Rocky Mountains, 1890-1894. He wrote "Beyond the Marshes"; "Black Rock"; "Given's Cañon"; "The Sky Pilot"; "Ould Michael"; and "The Man from Glengarry" (1901); "The Foreigner" (1909); "Corporal Cameron of the Northwest Mounted Police" (1912).

GORDON, GEORGE ANGIER, an American clergyman and writer; born in Scotland in 1853. He attended the common schools in Scotland and removed to the United States in 1871. He graduated from Bangor Theological Seminary in 1877 and from Harvard University in 1881. He was ordained to the Congregational ministry in 1877, and was pastor of churches in Maine and in Greenwich, Conn., from 1881 to 1883. In the following year he was appointed pastor of the Old South Church, Boston. He was university preacher at Harvard from 1886 to 1890, and at Yale from 1888 to 1901. He was an overseer of Harvard University from 1897 to 1916. He was a member of the National Institute of Arts and Letters. His published writings include "The Christ of To-day" (1895); "The New Epoch for Faith" (1901); "Through Man to God" (1906); "Humanism in New England Theology" (1920). He was president of the Harvard Alumni Association in 1918.

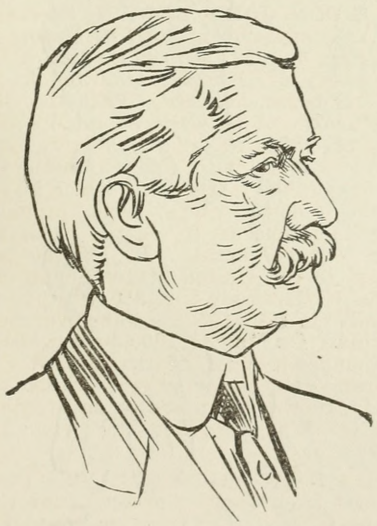
GORDON, JOHN BROWN, an American military officer; born in Upson co., Ga., Feb. 6, 1832; was graduated at the University of Georgia; admitted to the bar and began practice. When the Civil War broke out he was appointed a captain of infantry in the Confederate army; served with marked distinction throughout the war, during which he was wounded eight times; was promoted Brigadier-General in April, 1863, and later Major-General. In 1873 he was elected to the United States Senate and served in that body till 1880, when he resigned. In 1887-1900 he was governor of Georgia. On May 31, 1900, he was chosen commander-in-chief of the United Confederate Veterans. General Gordon was widely known as an orator on events of the Civil War. He died in Florida, Jan. 9, 1904.

GORDON BENNETT, MOUNT (named from James Gordon Bennett), a mountain seen in Africa by Stanley in 1875. It lies S. of Albert Nyanza, a little N. of the equator and E. of lon. 30° E. It is a truncated cone, probably an extinct crater, and rises 14,000 or 15,000 feet in height. It is sometimes covered with snow.

GORE, THOMAS PYROR, an American senator; born in Webster co., Miss., in 1870. Although deprived of the sight of both eyes by two accidents in his early youth, he completed his education at the

Normal School at Walthall, Miss., in 1890, received the degree of B. L. from Cumberland University in 1892, and was admitted to the bar the same year. He removed to Texas in 1895 after active participation in local politics. After several years' connection with the People's party, he allied himself with the Democratic organization in 1899. He took an active part in the presidential campaigns of 1900 and 1904. Having removed to Oklahoma in 1901, he was a member of the Territorial Council 1902-1905, and became Senator from Oklahoma in 1907. He was re-elected in 1909 and 1915, but was defeated in 1920. From 1912-1916 he was a member of the executive committee of the Democratic National Committee.

GORGAS, WILLIAM CRAWFORD, an American physician; born at Mobile, Ala., Oct. 3, 1854. He graduated from the University of the South, in 1875, received the degree of M. D. from the Bellevue Hospital Medical College in 1879, and served as interne at Bellevue Hospital 1878-1880. Appointed a surgeon in the United States Army in 1880, he rose successively through the ranks of captain, assistant surgeon, major brigade



GENERAL WILLIAM C. GORGAS

surgeon of volunteers, and became chief sanitary officer of Havana, Cuba, in 1898. He continued in charge of sanitary administration at Havana until 1902, and by his efficient methods of direction and control in the fight against the yellow fever he finally accomplished the practical elimination of that disease from the port of Havana. Congress, by special act, Mar. 9, 1903, made him colonel assistant surgeon-general in recognition of his successful campaign against the yellow fever plague. He was subsequently honored by the University of Pennsylvania, and the University of the South, Harvard, and Brown University with honorary degrees in acknowledgment of the extraordinary merit of his achievements. In 1914 he was made surgeon-general, U. S. A., with rank of brigadier-general, and was advanced to major-general in 1915. He retired from the service in 1918, and became director of the division of yellow fever research of the Rockefeller Foundation, having previously become a permanent director of its International Health Board. As chief sanitary officer (1904) in connection with the building operations of the PANAMA CANAL (*q. v.*), he did his most distinguished public work, and brought to a successful sanitary issue the difficult task of cleaning up the fever-infested isthmian territory. His work made possible the maintenance of the high record of industrial efficiency which was a large factor in contributing to the rapid completion of the canal. In 1907 he became a member of the Isthmian Canal Commission. He was honored by some of the most exceptional national and foreign awards for scientific achievement, and was a member of many domestic and foreign scientific societies. He died in London, England, July 4, 1920, when about to depart on a mission to west Africa in behalf of the British Government to investigate sanitary conditions.

GORGES, SIR FERDINANDO, styled "the father of colonization in America"; born in Ashton, Somersetshire, England, about 1565. He founded two Plymouth companies (1606-1620 and 1620-1635) for acquiring and planting lands in New England, and in 1639 received from the king a charter constituting him proprietor of Maine. He adhered to the king in the civil war, and died in 1647. His son neglected the province, which finally placed itself under the jurisdiction of Massachusetts, to which colony Sir Ferdinando's grandson sold his rights in 1677 for £1,250.

GORILLA, a celebrated anthropoid ape, generally believed to come nearer than any known one to man, though some contend that the affinity of the GIBBON (*q. v.*) is closer. The number of teeth in the gorilla, and all the old world monkeys, except the lemurs, is 32, the same as in man. The hand has the same bones as in man. The height is about 5 feet. The greatest capacity of the gorilla's brain is only 34½ cubic inches, the least

23, against 62 in the least capacious human skull, and 114 in the greatest. The formidable canines are only sexual characteristics, being of more moderate size in the female. The low facial angle also, and the abundant hair, with the extraordinary breadth of the chest diminish the resemblance to man. The last mentioned characteristic imparts to the animal colossal strength. It is a native of Lower Guinea and the interior of equinoctial Africa. It has a congener in the same region, the CHIMPANZEE (*q. v.*).



GORILLA

A. Skull B. Foot C. Hand

GORIZIA or **GÖRITZ** or **GÖRZ.** A town which figured prominently in the World War, in the former Austrian crownland of Görz and Gradisca, now an Italian possession on the river Isonzo, about 36 miles N. W. of Triest. The situation is attractive, the buildings being on an elevation which overlooks the Isonzo valley, with castles, monasteries, and churches, ancient and picturesque in character, in the foreground. It is the seat of an archbishopric, and contains a cathedral of the 17th century, archbishop's palace, college, barracks, and government buildings. During the Austrian occupation it was regarded as the center of an Adriatic Riviera, and was much frequented by Austrians for health and vacation. The establishments include schools of various kinds, libraries, hospitals, seminaries and experiment stations. Its manufactures are considerable, including silks, thread, pottery, leather,

watches, and it is a center of agricultural produce. The population which numbers about 30,000, is mainly German-speaking and Italian-speaking, but in race and history the town is more Italian than Austrian. During the war Gorizia was one of the most hardly contested points of the Austro-Italian front. It was strongly held by the Austrian forces. On August 4, 1916, General Cadorna opened fire along the Isonzo front, delivering a frontal attack on the forces opposite Gorizia. The Italian forces went forward with the utmost vehemence and the heights of Monte Calvario and Monte Podgora above Gorizia were carried in the first rush. South of Gorizia the Italians also took Monte San Michele, the key to the Gorizia position, which had been a heavily contested point from the first clash between Italy and the Austrians. The Austrian forces met the repeated attacks of the enemy with great stubbornness; nevertheless, after a battle lasting two days, the heights west of Gorizia were occupied, and King Victor Emmanuel at the head of his infantry entered Gorizia on August 9. From that time forth the Italian commander put forth all his efforts to consolidate his position around Gorizia. The city was turned into a veritable stronghold, and was made a base of supply for the advance toward the capture of Trieste. But east of Gorizia were great elevations well guarded by Austrian guns, with whole labyrinthine intrenchments blocking the way. During the Italian offensive in the early part of August the Austrians had lost, according to the Italian estimate, 65,000 men, including 18,758 prisoners. In November, Italian forces, attacking the heights east of Gorizia, brought in 9,000 more Austrians. During the winter the Italians made preparations for a great offensive, starting from Gorizia, which was intended to capture Trieste, destroy Austrian naval power in the Adriatic and open the road to Vienna. The enemy was first to be engaged all along the line, and then a surprise attack was to be launched north of Gorizia. An attempt of this sort was made in May, 1917, and some initial successes were obtained, Monte Cucco, Monte Santo, Lucati, and Bagni, being captured. But the Austrians had also been making preparations, and were re-enforced by the collapse of Russia. In June they launched a strong offensive, driving back the Italians. Austrians and Italians then for a time answered offensive with offensive, and the Italians won some signal successes crossing the Isonzo in August, after diverting the river by an important engineering feat. Toward the end of 1917, however, the Austrian forces staged a big surprise. Austro-German batteries on October 21 bombarded the Plezzo-Tolmino front with extraordinary intensity, the infantry breaking through the Italian positions and crossing the Isonzo. Advancing down the Natisone and Indrio river valleys, they forced the second and third Italian armies to retire. In five days the Austro-Germans were able to announce that they had captured 60,000 men and 500 guns. Seizing Monte Matajar, which overlooked the Italian rear, and capturing the workers on the roads behind the front, they forced the Italians on the Carso plateau hastily to fall back over the Isonzo, and menaced the entire army in that region. On Oct. 28 railway communication between the front and Udine was interrupted by the capture of Cividale, and Gorizia fell simultaneously into the hands of the Austrians. The Austrian advance did not halt till the Piave river was reached. Before the enemy reached the Tagliamento, Italy had lost 180,000 men, and 1,500 guns. At the Livenza the totals had swelled to 250,000 and 2,300 guns. At the Piave, German reports showed a gain of 300,000 men, 2,700 guns, with the occupation of 4,000 square miles of Italian territory. From those positions there was little charge to the end of the war and Gorizia was made a powerful base of supply behind the Austrian front.

GORKY, MAXIM, the pseudonym of a Russian novelist and short story writer, whose real name is Alexei Maximovitch Pyeshkov, born in Nizhni-Novgorod, 1868. He was of humble parentage, and, being an orphan at nine, became a shoemaker's apprentice. He did not remain long at this trade, nor at any trade, in fact, but wandered about the country doing odd jobs and tramping between whiles. Thus he became intimately acquainted with the class of people, outcasts and beggars, who are the chief characters of his stories and novels. Gradually his experiences found expression in literary form and by 1905 Gorky was one of the most popular writers of Russia. He was in close sympathy with the Russian revolutionary parties, and was twice arrested for his revolutionary activities, but his prominence as a literary man, abroad as well as in Russia, made it inadvisable for the Czar's Government to punish him severely. In 1906 he visited the United States to raise money for the Russian revolutionary movement, but his mission failed because of the fact that the Russian Church had not legalized his marriage to the woman who accompanied him. For some years he lived in Italy,

in delicate health, but during the World War he returned to Russia, to participate in the general effort to crush German Imperialism. He supported the Russian Revolution of March, 1917, enthusiastically, but bitterly opposed the Bolsheviki when they came into power in the following November. Later he co-operated with them, but continued his criticism of their principles and tactics.

Gorky's fame as a writer is particularly strong in this country, and England. His short sketches of the Russian underworld are powerful, if crude, but his novels and plays show less virility, while his political and economic essays betray his lack of early training and education. Almost all his writings are available in English. Among his best known collections of short stories are: "Orloff and His Wife" (1901), and "The Outcasts and Other Stories" (1902). Among his best known novels are: "Mother" (1907); "The Spy" (1908); and "A Confession" (1910). His plays are not popular in this country, but "A Night's Lodging" (1905) has been much commented upon.

GÖRLITZ (ger'lits), a town of Prussian Silesia, on the left bank of the Neisse, 49 miles W. of Liegnitz. Among its beautiful Gothic churches is that of St. Peter and St. Paul (1423-1497). Outside the town is the Kreuzkapelle (1481-1489), an imitation of the Holy Sepulcher at Jerusalem. A railway viaduct, upward of 2,720 feet in length and 118 feet high, here crosses the valley of the Neisse. Görlitz has manufactures of cloth, its staple; cotton, linen, and fictile wares, with iron foundries and machine shops. Here Jacob Boehme spent most of his life and died. Görlitz was taken and held alternately by the Swedes and the Imperialists during the Thirty Years' War. Pop. about 86,000.

GOSCHEN, GEORGE JOACHIM (gō' shen), an English statesman; born in London, England, Aug. 10, 1831. He was educated at Rugby and Oriel College, Oxford. In 1863 he entered Parliament as a Liberal for the city of London. When Lord Russell, after Palmerston's death, reorganized the Liberal ministry, he appointed Goschen vice-president of the Board of Trade, in November, 1865. In the following January the latter entered the cabinet as chancellor of the Duchy of Lancaster. When Gladstone became prime minister in 1868, Goschen took office as president of the poor-law board and in 1871 the head of the admiralty, which post he retained till the fall of the Gladstone ministry in 1874. His next public work was the regulation, in conjunction with Joubert, of the Egyptian finances (1876). In 1878 he represented Great Britain at the International Monetary Conference held at Paris, and two years afterward, as ambassador extraordinary to the Porte, enforced on Turkey the fulfillment toward Greece of the treaty of Berlin. He strenuously opposed home rule; in 1887-1892 was Unionist Chancellor of the Exchequer, and in 1888 converted part of the national debt. In 1895-1896, as First Lord of the Admiralty, he made provision for increasing the navy. He published "Foreign Exchanges" (16th edition, 1894), besides addresses, pamphlets, books on education, etc.; and was Lord Rector of Aberdeen and Edinburgh Universities. He sat for London 1863-1880; Ripon 1880-1885; East Edinburgh 1885-1886, and St. George's, 1887-1886. He died in 1907.

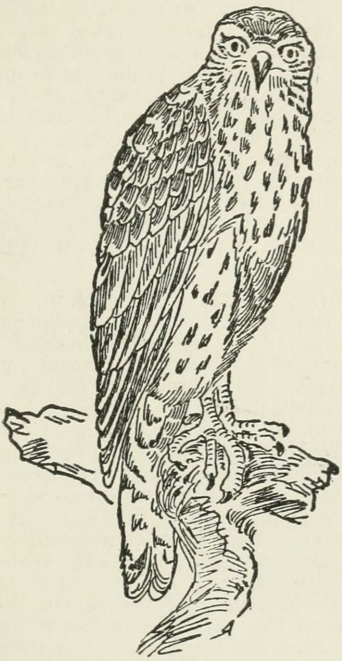
GOSCHEN, SIR WILLIAM EDWARD, an English diplomat, born in London, in 1847. He was educated at Rugby and entered the diplomatic service in 1869. He served successively in various capacities at Buenos Aires, Paris, Rio de Janeiro, Peking, Copenhagen, Washington, and St. Petersburg. From 1898 to 1900 he was Ambassador at Belgrade and filled the same post at Copenhagen from 1900 to 1905. After three years of service as Ambassador at Vienna, he was in 1908 made Ambassador to Germany. He occupied this post at the outbreak of the World War, and took part in vain efforts to persuade the German Government to refrain from hostile measures.

GOSHAWK, or **GOSHAUK** (properly goosehawk), *Astur palumbarius*, a bird of prey. It is brown above, white underneath, barred across with brown, with five browner bands on the tail; the eyelids whitish. It is abundant in parts of the European continent. It occurs also in this country, in the N. of Africa, in India, etc. It can be used, as it often is in the East Indies, for falconry.

GOSHEN, a city and county-seat of Elkhart co., Ind.; on the Elkhart river and the Lake Shore and Michigan Southern, and the Cleveland, Cincinnati, Chicago and St. Louis railroads; 25 miles S. E. of South Bend. It manufactures wool, rubber goods, condensed milk, furniture, iron, flour, and farming implements; has a court house, high school, several churches, Goshen College, a library, a National bank, daily and weekly newspapers. Pop. (1910) 8,514; (1920) 9,525.

GOSHEN, a village and county-seat of Orange co., N. Y., on the Erie, and the Lehigh and New England railroads;

59 miles N. W. of New York. It carries on a large trade in cheese and butter, which are widely celebrated for their excellence. It contains a court house, waterworks, churches, 2 National banks, and several weekly newspapers. Pop. (1910) 5,149; (1920) 5,016.



GOSHAWK

GOSLAR (gos'lär), an ancient town of Hanover, on the N. slope of the Harz Mountains, 27 miles S. E. of Hildesheim. It was at one time a free imperial city, and the residence of the emperors; has several noteworthy old buildings, as the tower called "Zwinger," with walls 23 feet thick, the late Romanesque Church Neuwerk, of the 12th century, and the Frankenberger Church (1108, restored 1880), both with ancient frescoes; the emperor's house, built in 1050 by Henry III., the dwelling-house of the emperors till the middle of the 13th century, the meeting place of more than 20 imperial diets, restored in 1867-1880; the town house, built in 1136-1184; and the Kaiserworth an old building containing statues of eight emperors. To the S. of the town is the Rammelsberg, a mountain formerly very rich in silver, gold, copper, lead, sulphur, and green vitriol. The mines have been worked since 968. Goslar was founded by Henry I. in 920. About 1350 it joined the Hanseatic League. Its ancient prosperity began to depart from it in the middle of the 16th century; and it suffered severely in the Thirty Years' War. In 1802 it ceased to be a free imperial town and fell to Prussia, to whom it again returned in 1866, after having in the meantime belonged to Westphalia (from 1807) and Hanover (from 1816). Here were born Henry IV. and Marshal Saxe. The Wordsworths were here in 1798. Pop. about 18,000.

GOSLARITE, an orthorhombic, white, reddish, bluish, transparent or translucent, brittle mineral of vitreous luster and nauseous taste. Called aslo gallitzenite.

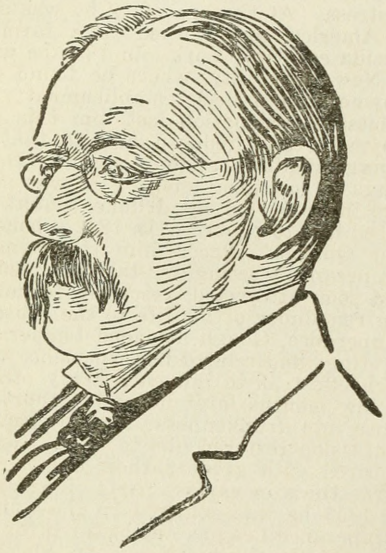
GOSPEL, a word used as the English equivalent of the Greek *evangelion*, or rather *euaggelion*, a good or joyful message. In the New Testament it denotes primarily the glad tidings respecting the Messiah and His kingdom—this was emphatically the Gospel (Anglo-Saxon, *gôdspell*, good tidings). It was quite naturally employed as a common title for the historical accounts which record the facts that constitute the basis of Christianity.

GOSPORT (God's port), a market-town and seaport of England, county of Hants, on the W. shore of Portsmouth harbor, and directly opposite Portsmouth, with which it is connected by a floating bridge. There are an extensive iron foundry for the manufacture of anchors and chain cables, naval powder magazines, barracks, the Royal Clarence victualing yard, which contains a brewery, a biscuit-baking establishment, and numerous storehouses and Haslar Hospital. Pop. (1917) 34,000.

GOSSE, EDMUND, an English author; son of Philip Henry Gosse; born in London, Sept. 21, 1849. As a poet he is known by "Madrigals, Songs, and Sonnets"; "On Viol and Flute"; "The Unknown Lover." From 1904-1914 Librarian of the House of Lords. Some of his criticisms and biographies are contained in "Seventeenth Century Studies" and "From Shakespeare to Pope." He wrote also in prose "Northern Studies" (1879); "Gossip in a Library" (1891); "Questions at Issue" (1893); "History of Modern English Literature" (1897); "Life and Letters of Dr. John Donne" (1899); "Coventry Patmore" (1905); "Father and Son" (1907); "Portraits and Studies" (1912); "Collected Poems" (1913).

GOSSE, PHILIP HENRY, an English naturalist; born in Worcester, England, April 10, 1810. In 1827 he went to Newfoundland as a clerk, and

was afterward in turn farmer in Canada, schoolmaster in Alabama, and professional naturalist in Jamaica. Returning to England, he published "Canadian Naturalist" (1840). He wrote "Birds of Jamaica" (1851); "A Naturalist's Sojourn in Jamaica" (1851); "Naturalist's Ramble on the Devonshire Coast" (1853); "Aquarium" (1854); "Manual of Marine Zoölogy" (1855-1856); "Romance of Natural History" (1860-1862), his best known work; "Actinologia Britannica" (1860); "Popular British Ornithology" (1853). In the year 1886 he placed in the hands of Dr. C. T. Hudson the notes and drawings of a lifetime on the microscopic study of the *Rotifera*. He was elected a Fellow of the Royal Society in 1856. He died in Torquay, Devon, in 1888.



EDMUND GOSSE

GOTH, one of an ancient race belonging to the Teutons, who originally occupied a great portion of European and Asiatic Russia. Filmer, their king, conducted a body of his nation to the coast of the Euxine, where it afterward increased into a numerous and formidable people under the names of Visigoths and Ostrogoths, the former occupying the countries to the W. of the Dnieper, the latter those to the E. The Visigoths crossed the Danube, plundered Rome and Italy, and fixed their residence in Spain, while their kindred, the Ostrogoths, took possession of Italy, which they held till A. D. 544, when they were overthrown by Narses, general of Justinian. From this time the Goths as a nation make no figure in history except in Spain; but traces of their language, manners, and arts are still to be found in every country of the East. A branch of the Visigoths, settled in Mœsia, the modern Bulgaria, are known as Mœsogoths, and the translation of a great portion of the Bible by Wulfila, or Ulfila, a Christian bishop, about A. D. 350, fragments only of which have come down to us, is the earliest known specimen of the Gothic or Teutonic tribe of tongues. Figuratively, a barbarian; one deficient in or utterly without taste; a rude, ignorant person.

GOTHA (gō'tä), a town of Germany, alternately with Coburg the capital of the former duchy of Saxe-Coburg-Gotha, 31 miles W. by S. of Weimar, on the N. outskirts of the Thuringian Forest. It is a handsome, well-built town, with fine parks. The principal public building is the castle of Friedenstein, built in 1643, 78 feet above the town; it contains a library of over 200,000 volumes and 6,000 MSS., and a very valuable numismatic collection. The museum (1878), in the Renaissance style, contains the picture gallery, in which Cranach, Van Eyck, Holbein, Rubens, and Rembrandt are represented; a very excellent cabinet of engravings; a natural history collection; collections of Egyptian, Roman, Greek and German antiquities; and a Japanese and Chinese museum. A new observatory was built in 1874. Gotha prior to the World War was an active industrial town, the principal manufactures being shoes, fire engine pipes, sugar and toys. Gotha sausages have a widespread celebrity. Several hundreds of designers, engravers, printers, and map-colorers were employed here in the geographical establishment of Justus Perthes, who also publishes the "Almanach de Gotha" (see ALMANAC). Pop. about 39,500.

GOTTHARD, ST. See ST. GOTTHARD.

GOTHLAND or **GOTTLAND**, a Swedish island in the Baltic, 44 miles E. from the mainland, and with Farö, Gotsk Sandö, and other smaller islands constituting the province of Gottland or Wisby; area, 1,219 square miles; pop. (1918) 56,028. The island consists mainly of terrace-like slopes of limestone, encircled by cliffs, broken by numerous deep fiords, more especially on the W. coast; the E. parts are flat. Next to agriculture, the chief occupations of the inhabitants are fishing, fowling, and lime-burning. In the Middle Ages the island belonged to the German Hanseatic League, but was restored to Sweden in 1645. Capital, Wisby.

GOTTENBURG, or **GÖTEBORG** (got'enbörg), a seaport town in Sweden, the second in importance, capital of the län of the same name; at the mouth of the Göta, in the Kattegat, 255 miles W. S. W. of Stockholm, intersected by canals. It is one of the best built towns in Sweden, and the seat of a bishopric. It has manufactures of sail-cloth, cotton, and other goods, and possesses shipbuilding yards, tobacco factories, breweries, sugar refineries, etc. The trade is very extensive. Among social reformers the town is noted for its management of the liquor question. Pop. (1919) 197,421.

GÖTTINGEN (get'ting-en), a town in the Prussian province of Hanover; 538 feet above sea-level on the Leine; 67 miles S. of Hanover, and 36 N. E. of Cassel. The celebrated university (Georgia Augusta) was founded in 1734-1737. Connected with it are the library of 600,000 volumes, the art museum, the splendid botanic garden (laid out by Haller), the observatory, the laboratory, the lying-in hospital, etc. Longfellow, Motley, Ticknor, Bancroft, and other illustrious Americans studied at Göttingen. The Göttingen Poet-League was a small poet band who in the "storm and stress" days of 1770-1778 did much for the revival of national feeling; by the "Göttingen Seven" are meant the seven professors (Albrecht, Dahlmann, Ewald, Gervinus, the two Grimms, and Weber) who for their liberal tendencies were in 1837 expelled by King Ernest Augustus. The book trade is of more importance than the manufactures—woolens, sugar, chemicals, etc. Raised to a town in 1210, and a considerable member of the Hansa in the 14th century, Göttingen suffered much during the Thirty Years' War, when it was taken by Tilly in 1626, and recaptured by the Swedes in 1632. Pop. about 38,000.

GOTTLIEBEN (got'lē-ben), a small town of Thurgau canton, Switzerland, 1 mile W. of Constance; its castle was the prison of John Huss, Jerome of Prague, and Malleobus.

GÖTZ VON BERLICHINGEN (gets fon ber'lich-ing-en), a German knight of the 16th century; born in Jaxthausen, Württemberg, in 1480. Götz is an abbreviation of Gottfried. At the siege of Landshut (1505), he lost his right hand, which was replaced by an artificial one of steel, cunningly invented by himself; it is still shown at Jagstfeld. He wrote an account of his own turbulent life on which Goethe grounded his drama of "Götz of Berlichingen." Died in his castle at Hornberg on the Neckar, July 23, 1562.

GOUCHER COLLEGE, an institution for the higher education of women, founded in Baltimore, Md., in 1844, as the Woman's College of Baltimore. In recognition of gifts made by Reverend John F. Goucher, the name was changed in 1910 to Goucher College. In 1920 there were 793 students and 70 instructors. President, W. W. Guth, Ph. D.

GOUDA (gou'dä), a town of South Holland, on the right bank of the Hollaendsche Yassel, 13 miles N. E. of Rotterdam. The Church of St. John has a suite of magnificent stained glass windows (1560-1603) by the brothers Crabeth, and a fine organ.

GOUGH, JOHN BARTHOLOMEW, an American temperance lecturer; born in Sandgate, Kent, England, Aug. 22, 1817. His father was a pensioner of the Peninsular war, his mother a village schoolmistress. At the age of 12 he was sent to America, and worked on a farm in Oneida co., New York. In 1831 he went to New York City, where he found employment in a book establishment; but habits of dissipation lost him this employment, and reduced him to that of giving recitations and singing comic songs at low grog shops. He was married in 1839; but his drunken habits reduced him to poverty. In 1842 a benevolent Quaker induced him to attend a temperance meeting and take the pledge; and soon afterward, resolving to devote the remainder of his life to the cause of temperance, Gough attended temperance meetings and related his experience with such effect as to influence many others. A few months later he had a short relapse into drunkenness; but an eloquent confession restored him to favor, and he lectured with great pathos, humor, and earnestness in various parts of America. In 1853 he was engaged by the London Temperance League, and lectured for two years in the United Kingdom, where he attracted large crowds to his meetings. He was again in England in 1857-1860 and 1878. "Autobiography" (1846); "Orations" (1854); "Temperance Address" (1870); "Temperance Lectures" (1879); and "Sunlight and Shadow, or Gleanings from My Lifework" (1880). He died in Frankford, Pa., Feb. 18, 1886.

GOULBURN, a town of New South Wales, 134 miles S. W. of Sydney; with several tanneries, boot and shoe factories, flour mills, and breweries, and a busy trade in agricultural produce. The seat of an Anglican and of a Roman Catholic bishop, it contains a handsome Church of England cathedral (Gothic, consecrated in 1884), and a Roman Catholic cathedral. It has also a Catholic college and a convent. Pop. (1917) 10,646.

GOULD, JAY, an American financier; born in Roxbury, N. Y., May 27, 1836; was brought up on his father's farm; attended Hobart College a short time, acquired a taste for mathematics and surveying; made surveys of Ulster, Albany, and Delaware counties, and began his railroad career directly after the panic of 1857; invested in bonds of the Rutland and Washington railroad, and became president, treasurer, and superintendent of the road. Soon afterward he effected a consolidation of his road with the Rensselaer and Saratoga road, withdrew his capital, removed to New York, opened a broker's office, and began dealing in Erie stocks and bonds. In association with James Fisk, Jr., he entered the directory of the company, and was elected president, with Fisk as vice-president and treasurer. On the reorganization of the company, 1872, he lost official connection with it. He then invested heavily in the various Pacific railroads, secured control of a number of important lines, built branches, and effected combinations which resulted in the establishment of what is known as the "Gould system." He died in New York City, Dec. 2, 1892, leaving property valued at $72,000,000.

GOUNOD, CHARLES FRANCOIS (gō-nō'), a French composer; born in Paris, France, June 17, 1818. He studied at the conservatoire under Halévy, Lesueur, and Paer. Obtaining the first prize in 1839, he was sent to Rome and while there devoted himself chiefly to religious music. A "Solemn Mass," was the first work which brought him into general notice. His first opera, "Sappho," was produced in 1851. His comic opera, "The Physician in Spite of Himself" (1858), was a great success; it was followed in 1859 by "Faust," his chief work, which raised its composer to the foremost rank of contemporary musicians. It was followed by "Philemon and Baucis" (1860); "The Queen of Sheba" (1862); "Mireille" (1864); "Romeo and Juliet" (1867); "Polyeucte" (1878); "The Tribute of Zamora" (1881). He also published much church music, and was popular as a song-writer. From 1870 to 1875 he resided in England. He was a member of the Institute (1866), and a commander of the Legion of Honor (1877). He died in St. Cloud, France, Oct. 18, 1893.

GOUROCK, a watering place of Renfrewshire, Scotland, on the Firth of Clyde, 3 miles W. N. W. of Greenock, by a railway opened in 1889, since which time it has become the starting point of Irish and other steamers. At Kempoch Point here, behind which rises Barrhill (478 feet), stands "Granny Kempoch," a prehistoric monolith associated with the witches of Renfrewshire (1662). In 1688 the first red herring ever cured in Great Britain was cured at Gourock.

GOVERNMENT, the form of policy in a state; the mode of system according to which the legislature, executive, and judicial powers are vested and exercised; a system of laws and customs; a constitution. There are numerous forms of government; as aristocracy, democracy, despotism, monarchy, oligarchy, republicanism, etc. Also the council or body of persons intrusted with the administration of the laws; the management of home and foreign affairs, and generally the public business of a state; the administration; the ministry; the executive power.

GOVERNOR'S ISLAND, a small island at the main entrance of Boston Harbor; Fort Winthrop is built on it. Also an island in New York harbor; Fort Williams, the headquarters of the Military Department of the East, U. S. A., is built on it.

GOWER, JOHN, an early English poet, a contemporary and friend of Chaucer; born about 1330. His chief works are his "Thinker's Mirror," "Voice of One Crying," and "Lover's Confession," of which the first was a moral tract relative to the conjugal duties, written in French rhymes (now lost); the second a metrical chronicle of the insurrection of the commons under Richard II., in Latin elegaic verse; and the third an English poem in eight books, containing 30,000 lines, relative to the morals and metaphysics of love, one of the earliest products of the English press, being printed by Caxton in 1483. He died about 1408.

GOYAZ (gō-yäz'), the central state of Brazil, in the dry plateau region, rising in the S. to an important range of mountains; area 288,546 square miles; pop. about 542,000. The Tocantins river traverses most of the state from S. to N., and receives the Araguay, which forms the W. boundary; the S. frontier is marked by the Paranahyba. The climate in the S. is healthy, but in the N. malignant fevers are common, and the cattle are subject to goiter. Stock-raising is the chief industry.

GOZO (got'sō), an island in the Mediterranean, 4 miles N. W. of Malta and belonging to Great Britain; with the adjacent smaller island of Comino, area 26 square miles; pop. over 20,000. The surface is hilly, but the soil fertile. Chief town Rabato, near the center of the island.

GRACCHUS, CAIUS SEMPRONIUS (grak'-us), a Roman politician, younger brother of Tiberius Gracchus, and like him a reformer. The patricians artfully proposed measures more popular than those which he brought forward, and turned the popular feeling away from him, when they commenced the repeal of all the reforms he had effected. On his opposing this, they raised a faction fight, and massacred thousands of his adherents in the streets and in the prisons. He had himself put to death by his own slave, that he might not fall into their hands, in 121 B. C.

GRACCHUS, TIBERIUS SEMPRONIUS, a Roman politician, son of Tiberius Sempronius Gracchus and Cornelia, daughter of Scipio Africanus Major; born about 168 B. C. He was already a distinguished soldier when in 137 he served as quæstor to the army of the consul Manicus in Spain, where the remembrance of his father's honor, after 40 years, enabled him to gain better terms for the 20,000 Roman soldiers who lay at the mercy of the Numantines. But the peace was repudiated at Rome, and Mancinus was stripped naked and sent back to the Numantines. Elected tribune of the people in 133, he endeavored to reimpose the agrarian law of Licinius Stolo, and after violent opposition on the part of the aristocratic party, who had bribed his colleague M. Octavius Cæcina, he succeeded in passing a bill to that effect. Tiberius Gracchus, his brother Caius, and his father-in-law Appius Claudius were appointed triumvirs to enforce its provisions. Meantime Attalus, King of Pergamus, died, and bequeathed all his wealth to the Roman people. Gracchus proposed that this should be divided among the poor, to enable them to procure agricultural implements and to stock their newly acquired farms. It is said that he also intended to extend the franchise, and to receive Italian allies as Roman citizens. But fortune turned against the good tribune. He was accused of having violated the sacred character of the tribuneship by the deposition of Cæcina. In the midst of the next election for the tribuneship, in 133 B. C., Tiberius Gracchus, with some hundreds of his friends, was murdered.

GRACE, DAYS OF, in commerce, a certain number of days immediately following the day, specified on the face of a bill or note, on which it becomes due. Till the expiry of these days payment is not necessary. In Great Britain the days of grace are three: in the United States they have been abolished generally in National bank operations.

GRADISCA (grä-dis'kä), a town of Italy, on the Isonzo, 25 miles N. W. of Trieste. First fortified by the Venetians in 1478. Gradisca, with its territory, came into the hands of Austria in 1511, and during the next century and a half figured frequently in the wars between Austria and Venice. In 1647 it became a principality of the empire, but lapsed to the imperial crown again in 1717, and in 1754 was united to Görz. It reverted to Italy as the result of the treaty of St. Germain, following the World War.

GRADY, HENRY WOODFEN, an American journalist; born in Athens, Ga., in 1851; was educated at the University of Georgia; served in the Confederate army during the latter part of the Civil War; became one of the staff of the Atlanta "Herald," and correspondent of the New York "Herald" in Georgia. His writings contributed much to the growth and prosperity of the "New South"; he was also one of the editors of the Atlanta "Constitution." Among Southern editors he was perhaps more widely known than any other. He died in Atlanta, Ga., Dec. 23, 1889.

GRÄFENBERG (grā'fen-berg), a village of Czecho-Slovakia, 50 miles N. of Olmütz. It is celebrated as the spot where the water-cure (see HYDROPATHY) was introduced in 1826 by Vincenz Priessnitz (1799-1851). It still is visited yearly by many persons.

GRAFTING, in carpentry, a scarfing or endwise attachment of one timber to another, as in attaching an extra length or false pile to one already driven. In nautical language, the tapering of the end of a rope, usually covered by weaving yarns around it. In surgery, the transplanting of a portion of skin to a denuded surface.

In husbandry, the act or process of inserting a shoot or scion taken from one tree or shrub in a vigorous stock of its own or a closely allied species, so as to cause them to unite and enable the graft to derive a larger supply of nutritive power than it could otherwise obtain.

GRAFTON, a town in Worcester co., Mass.; on the New York, New Haven and Hartford railroad; 6 miles S. E. of Worcester. It contains several villages, high school and a public library; manufactures cotton goods, emery, thread, shoes, soap, etc. Pop. (1910) 5,705; (1920) 6,887.

GRAFTON, a city of West Virginia, the county-seat of Taylor co. It is on the Baltimore and Ohio railroad and

on the Tygart's Valley river. It is an important railroad center and has the terminals of four divisions of the Baltimore and Ohio railroad. Its industries include railroad shops, flour mills, machine shops, cigar factories, etc. It has an important wholesale grocery trade. There is a national cemetery within the borders of the city. Pop. (1910) 7,563; (1920) 8,517.

GRAFTON, AUGUSTUS HENRY FITZROY, DUKE OF, an English statesman, a descendant of Charles II.; born Oct. 1, 1735. In 1757 he succeeded his grandfather, the second duke (see CHARLES II.). He first came to the front in political life in 1763 in the opposition to Bute, and in July, 1765, he took office as Secretary of State under Rockingham, but resigned in the following May. Two months later Pitt became premier and Earl of Chatham, making Grafton First Lord of the Treasury; but in consequence of Chatham's continued illness Grafton was compelled to take on his own shoulders the responsible duties of head of the government from September, 1767. He resigned in 1770, accepted the office of Lord Privy Seal under Lord North in 1771, and filled it till November, 1775. When the new Rockingham ministry was formed in March, 1782, Grafton took his old post as Lord Privy Seal, but resigned office 13 months later. He was the target at which JUNIUS (*q. v.*) shot some of his sharpest invectives. He died in Euston Hall, Suffolk, England, March 14, 1811.

GRAHAM, SIR JAMES ROBERT GEORGE, an English statesman; born in Netherby, Cumberland, England, June 1, 1792. He was educated at Westminster and Queen's College, Cambridge. As private secretary to the British minister in Sicily in 1813, he had a hand in the negotiations with Murat at Naples. After his return for Carlisle as a Whig in 1826 he became a warm supporter of Catholic emancipation and a zealous advocate of the Reform Bill. Earl Grey thereupon offered him, in 1830, the post of First Lord of the Admiralty, with a seat in the cabinet. But in 1834 he seceded from the government, disagreeing with his colleagues on the appropriation clause of the Irish Church Temporalities Act; and, going over to the Conservatives, became in 1841 Home Secretary under Sir Robert Peel. In 1844 he issued a warrant for opening the letters of Mazzini, and caused the information thus obtained to be communicated to the Austrian minister, an act by which the ministry, and Graham in particular, incurred great obloquy. He also encountered great displeasure N. of the Tweed by his high-handed method of dealing with the Scottish Church during the troubles which ended in the Disruption and the formation of the Free Church. He gave Peel warm support in carrying the Corn Law Repeal Bill, and resigned office (1846) with his chief as soon as that measure was carried. On the death of Peel in 1850 he became leader of the Peelite party in the Lower House, and in December, 1852, took office in the Coalition Ministry as First Lord of the Admiralty. He retired from official life in February, 1855, and died in Netherby, Oct. 26, 1861.

GRAHAM, JOHN, VISCOUNT DUNDEE, commonly known as CLAVERHOUSE, a Scottish soldier, eldest son of Sir William Graham, of Claverhouse; born about 1650. He was educated at St. Andrews. He went abroad and entered the service of France and afterward of Holland, but returned to Scotland in 1677, where he was appointed captain of a troop of horse raised to enforce compliance with the establishment of Episcopacy. He distinguished himself by an unscrupulous zeal in this service. The Covenanters were driven to resistance, and a body of them defeated Claverhouse at Drumclog, June 1. On June 22, however, the Duke of Monmouth defeated the insurgents at Bothwell Brig, and Claverhouse was sent into the W. with absolute power. In 1682 he was appointed sheriff of Wigtonshire, and, assisted by his brother David, continued his persecutions. He was made a privy-councillor, and received the estate of Dudhope, with other honors from the king, and though on the accession of James his name was withdrawn from the privy-council it was soon restored. In 1686 he was made Brigadier-General, and afterward Major-General; and in 1688, after William had landed, he received from James in London the titles of Lord Graham of Claverhouse and Viscount Dundee. When the king fled he returned to Edinburgh, but finding the Covenanters in possession he retired to the N., followed by General Mackay. After making an attempt on Dundee, Claverhouse finally encountered and defeated Mackay in the Pass of Killiecrankie, July 17, 1689, but was killed in the battle.

GRAHAM, STEPHEN, an English author. He was born in 1884 and after leaving school engaged in journalism in London, and then went to live with peasants and students in Little Russia and Moscow, tramping in the Caucasus, Crimea, Ural Mountains, and on pilgrimage to Jerusalem, crossing Atlantic with emigrants, tramping from New York to Chicago, later in central Asia,

Egypt, Bulgaria, Rumania and Norway. Served in World War and contributed articles to "London Times." His works include: "A Vagabond in the Caucasus"; "Undiscovered Russia"; "A Tramp's Sketches"; "Changing Russia"; "Through Russian Central Asia"; "Priest of the Ideal"; "Private in the Guards."

GRAHAME, KENNETH, an English author, born in Edinburgh, in 1859. He was educated in England. He began his literary career as a contributor to newspapers and won wide notice through his "Pagan Papers," published in 1893. His best known works, however, are those dealing with childhood, including "The Golden Age" and "Dream Days," the first published in 1895 and the second in 1898. In 1908 he published "The Wind in the Willows." He was Secretary of the Bank of England.

GRAHAME-WHITE, CLAUDE, an English aviator and designer of aeroplanes, born in 1879. He was educated at the Bedford Grammar School and at Crondall House College. After some experience in the manufacture of motors, he organized an aviation school at Pau, France. In 1910 he made several notable flights with a Farman biplane, and in the same year he made a tour of America. He won the Gordon Bennett Trophy. On his return to England he formed the Grahame-White Aviation Company. He wrote "The Story of the Aeroplane"; "Air Power"; "The Airplane in War," "Aviation" and several boys' books dealing with aviation. He was also a frequent contributor to magazines on the same subject.

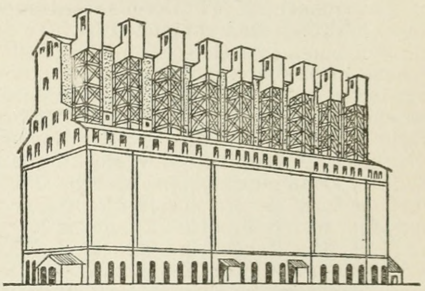
GRAHAM ISLAND, or **FERDINANDEA**, a volcanic island which in July, 1831, rose up in the Mediterranean, about 30 miles S. W. of Sciacca, in Sicily. It attained a height of 200 feet, with a circuit of 3 miles, but disappeared in August. It reappeared for a short time in 1863.

GRAHAM'S LAND, an island of the Antarctic Ocean, discovered by Biscoe in 1832 between 65° and 67° S. lat. In front, toward the N., are a number of islets, called Biscoe's Chain.

GRAHAMSTOWN, the capital of the former E. province of Cape Colony, now a part of the Union of South Africa, near the center of the maritime division of Albany, 1,728 feet above sea-level, 106 miles N. E. of Port Elizabeth. It is the seat of two Bishops—Anglican and Roman Catholic; and in its Anglican cathedral is a monument to Colonel Graham, after whom the city is named. Leather is manufactured, and among the institutions of the place are its museum, St. Andrew's College, a public library, etc. Pop. (1918) 7,087.

GRAIL, a term properly applied to the legendary dish used at the Last Supper, said to have been stolen by a servant of Pilate, used by him to wash his hands in before the multitude, afterward given to Joseph of Arimathea as a memorial of Christ, and finally used by Joseph to collect the blood which flowed from our Lord while hanging on the cross.

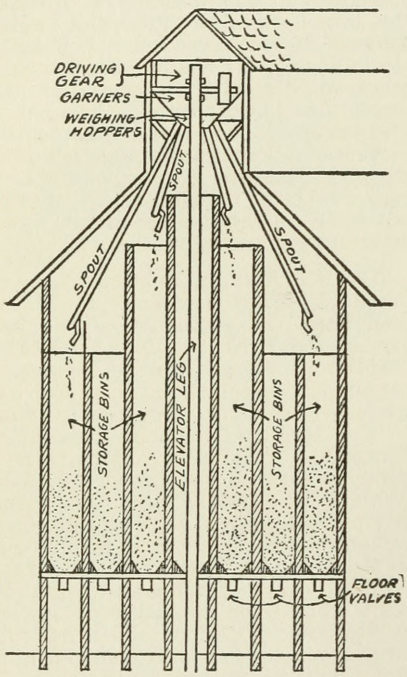
GRAIN ELEVATOR. A structure designed for the manipulation and storage of grain awaiting transportation. It is usually a high rectangular or cylindrical edifice, built of steel, enforced concrete, or some other suitable material. The bins containing the grain may form with the elevators and machinery a single large building or the machinery and the bins may be in separate establishments.



GRAIN ELEVATOR

There is in the larger establishments a working house connected with the bins or actually containing them. Other forms of elevators are those situated on railroad tracks, where a hopper receives the grain from the farmers' wagons whence it is scooped by belted buckets and conveyed to the bins. In the ordinary elevator the machinery and working rooms surmount the main building, where the storage bins are grouped. Over this main building usually lies the distributing floor, and over this again the floor containing the weighing hoppers and machinery for cleaning, and surmounting this again are the garners, leg-driving machinery and turnhead spouts. The grain is carried upward by belted buckets to the turnhead spouts and so conveyed to the garners. From the garners it passes to the main building, being cleared or otherwise treated, in the course of passage. The elevator legs are usually separated by the length of a railroad car so that the operation of transferring from the car to the elevator or from the elevator to the car may be carried on

simultaneously. With similar ends in view elevators are often built over freight railroad tracks, generally they have the track running alongside. Power shovels remove the grain from the car to the hoppers, whence the grain is carried upward to the topmost story to be submitted to the manipulation before described in its journey through the various floors to its proper bins. The principle is similar in the transference of grain from vessels to railroad cars, and from railroad cars to vessels. The elevator legs are so placed on the waterside that they come in connection with the vessel's hatches. The larger kind of these elevators are made of concrete, but in the smaller kind wood is largely used, and steel, brick and tile enter largely into the construction. The bins are



GRAIN ELEVATOR—CROSS SECTION

usually of steel or concrete with the main building of brick, while the upper stories may be of steel frame. Floating elevators are used to facilitate the transfer of grain from vessels at different points in the dock. The largest elevator is at Montreal, Canada. The elevators in Chicago have a capacity for handling grain to the extent of over 50,000,000 bushels, the Armour Company having an elevator capable of handling 5,000,000 bushels.

GRAINGER, PERCY ALDRIDGE, an Australian pianist and composer. He was born in Melbourne, Australia, in 1883, and studied music with his mother till the age of ten and then was educated at Frankfort-on-Main. He went to London when 17. His compositions for piano, voice, chorus, orchestra, and chamber music have been performed in many cities. His publications include: "British Folk-music Settings" (16 numbers); "Room-music Tit-bits" (3 numbers); "Kipling Settings" (5 numbers); "Father and Daughter," dance-ballad for chorus and orchestra; several songs and piano pieces; "Journal of the Folksong Society, No. 12."

GRAIN PRODUCTION. See tables under AGRICULTURE.

GRAINS. (1) A residuum of fiber and insoluble matters after infusion or decoction; as the grains of malt after the wort is decanted. (2) A bating solution of birds' dung, used in destroying the effect of lime, and in improving the flexibility of leather. (3) Pieces of sheet-metal, cast-iron, or tinned iron inserted into a mold for the purpose of supporting an accessory portion, such as a core, in position.

GRAMMAR, the science which treats of the words of which language is composed, and of the laws by which it is governed. It is of two kinds, descriptive and comparative. Descriptive grammar classifies, arranges, and describes words as separate parts of speech, and notes the changes they undergo under certain conditions. Comparative grammar, which is based on the study of words, goes further; it analyzes and accounts for the changes they have undergone, and endeavors to trace them back to their origin; it thus deals with the growth of language.

GRAMME (gram), the standard unit of French measures of weight, and is the weight of a cubic centimeter of distilled water at 0° Centigrade; the other weights have received names corresponding to the number of grammes they contain, or the number of times they are contained in a gramme. A gramme= 15.43248 grains troy, from which the equivalents in English measure for the other weights can easily be found; thus:

	Grains Troy.		Pounds Avoirdupois
Centigramme =	.1543234	=	.0000220462
Decigramme =	1.543234	=	.00220462
GRAMME =	15.43234	=	.0220462
Decagramme =	154.3234	=	.220462
Hectogramme=	1543.234	=	2.20462
Kilogramme =	15432.34	=	22.0462
Myriagramme=	154323.4	=	220.462
Quintal (*q.v.*) =	1543234	=	2204.62

GRAMONT (grä-môn'), the name of an illustrious French family, the best known of whom are: GABRIEL, a cardinal and diplomatist, in the time of Louis XII. and Francis I.; died in 1534. ANTHONY, duke of Gramont, marshal of France, and viceroy of Navarre, author of "Memoirs," died in 1678, ARMAND, son of the latter, and Count de Guiche, whose "Memoirs" also exist, 1638-1674; PHILIBERT, Count de Gramont, son of Anthony, known by his memoirs, written by his brother-in-law Anthony, Count Hamilton, died in 1720; ANTHONY, Duke de Gramont, a French marshal and ambassador, known as Count de Guiche, 1671-1725; LOUIS, Duke de Gramont, lost the battle of Dettingen, and was killed at Fontenoy, 1745. The last Duke of Gramont, father of the Duke of Guiche, and the countesses of Tankerville and Sebastiani. He died in 1836.

GRAMOPHONE, or "**DISC TALKING MACHINE**," a mechanism for reproducing sound, differing in construction, but not in principle, from the phonograph. It was invented in 1888 by Emile Berliner, a German-American inventor, who was chief instrument inspector of the Bell Telephone Co., and also inventor of the telephone transmitter.

The gramophone differs from the phonograph principally in that its records are engraved on discs instead of on cylinders. On the cylinder of the phonograph the vibrations reproducing the sounds are caused by winding grooves of uneven depths, the variation of depth causing the needle to vibrate up and down. The records on the discs of the gramophone are spiral grooves radiating outward from the center, and zig-zagging, so that the recording needle vibrates laterally, while the disc revolves in a horizontal position. In the gramophone, also, the needle, or stylus, is not propelled by a feed screw, the disc itself causing the stylus, or needle, to move, at the same time that it causes it to vibrate. Gramophone records were first made by photo-engraving sound tracings, or by direct etchings in copper or zinc. Later wax surfaces were employed. From the original record a disc, or matrix, was made, by electrotyping. This, in turn, is used for making impressions in celluloid, rubber or composition. Celluloid was first used, in a semi-heated state, but later it was found better to use hard rubber discs, on which the reversed records of the electrotypes were reproduced, in reverse, by heavy pressure. It was this improving process, perfected in 1895, which made the gramophone a commercial possibility. A further improvement followed by substituting for the rubber discs a composition of shellac, in which the records could be more sharply reproduced, resulting in clearer and more distinct sounds. Another substitute still is a fibrous die, faced with a thin layer of shellac on both sides. This gives a disc much lighter in weight, less susceptible to changes of climate or temperature and capable of harder usage. The motive power of the gramophone was at first applied by hand, but later a mechanism on the principle of a clock, driven by a spring, was invented by Eldridge R. Johnson, which not only supplied motive power but acted as a speed regulator. In more recent years the etching process of producing the records has been abandoned, the expiration of the regular gramophone patents enabling the various gramophone manufacturers to utilize the wax cutting process, while still retaining the principle of horizontal motion. This latter change, besides various other qualities of the phonograph, which were also incorporated, brought the phonograph to its present high degree of perfection. For the reproduction of singing and music the gramophone is considered the better instrument, the disc lending itself to infinite repetition, without deterioration of the records.

GRAMPIANS, a mountain range in Scotland. They commence in W. Scotland from the extremity of the lowest arm of the Frith of Clyde, between the counties of Argyle and Dunbarton, and running S., sweep round in a deep semicircle to the E., till they nearly impinge on the German Ocean, in the county of Kincardine. Before reaching this terminus a branch is thrown off, which, trending in a N. W. direction, forms a lesser curve, which, passing through Aberdeen, Banff, and Elgin, is finally lost on the skirts of Inverness-shire. In this extended course it sends up several lofty peaks that form the highest eminences in Scotland. Of these the most important are Ben Lomond, Ben Ledi, Ben More, Ben Lawer, and Ben Voirlich. Also, the name of a mountain chain in the colony of Victoria, South Australia, whose highest point is Mount William, which is 4,500 feet above the level of the sea.

GRAN, a town of Hungary, on the Danube, here crossed by a bridge of boats, 25 miles N. W. of Pest, and opposite the mouth of the Gran river. The town is the see of the primate of Hungary, and its great domed cathedral (1821-1856), on the castle hill, reveals in its magnificent proportions St. Peter's at Rome. The palace of the prince-arch-

bishop, who was formerly primate of Hungary, is the chief of many buildings in connection with the cathedral. Gran was the cradle of Christianity in Hungary; here St. Stephen, the first king, was born in 979, and baptized and crowned in 1000. In the next two centuries it became the greatest commercial town in the kingdom. Pop. about 20,000.

GRANADA, an ancient kingdom, and one of the old provinces in southern Spain, bounded by Andalusia, Murcia, and the Mediterranean. It is now divided into the provinces of Granada, Almeria, and Malaga, the united areas of which amount to 11,063 square miles. The surface of Granada is mountainous and picturesque in a high degree. The mountain ranges, the chief of which are Sierra Nevada, the Sierra de Ronda, and the Alpujarras, run parallel with the coast. The principal rivers are the Almanzora, Almeria, Genil, Guadalhorce, and Guadiaro. The province is on the whole fruitful and highly cultivated. The mountains are rich in silver, copper, lead, and iron. Granada was part of the Roman province of Boetica; but after the Arab invasion it formed an independent Moorish kingdom. It was the last possession of the Moors in Spain, and was conquered by Ferdinand and Isabella in 1492.

GRANADA, city and capital of the above province, was the ancient metropolis of the Moors in Spain, and stands on the Genil, 120 miles from Seville. The town exhibits the form of a half-moon, its streets rising above each other, with a number of turrets and gilded cupolas, the whole crowned by the Alhambra, or palace of the ancient Moorish kings. It is built on two adjacent hills, and divided into four quarters. The Darro river runs between the two hills and traverses the town, after which it falls into the larger stream of the Genil, which flows outside the walls. The principal buildings are the cathedral, the archbishop's palace, the mansion occupied by the captain-general of the province, the university; but the grand ornament of Granada is the Alhambra, the wonder of Arabian architecture. Its remains sufficiently evince its original splendor. It commands a beautiful prospect; but a still finer is afforded by another Moorish palace, called the "Generalife," built on the opposite hill, and the retreat of the court during the heats of summer. Pop. about 78,000.

GRANADA (gra-nä'dä), a department and city of Nicaragua. The department, lying between the Pacific and Lakes Nicaragua and Managua has an area of nearly 2,600 square miles; is mostly a level savannah, but contains the volcano of Masaya and the Mombacho peak (4,500 feet). The city is on the N. W. side of Lake Nicaragua, and is connected with Managua by rail. Founded in 1522, it was formerly the chief town of the republic, but has suffered greatly from the civil wars. It is still an important trading center. Pop. about 17,100.

GRAN CHACO (grän chä'kō), an extensive central tract of South America, extending from the S. tropic to 29° S. lat., and bounded on the E. by the Paraguay and Paraná, and on the W. by the Argentine provinces of Santiago del Estero and Salta; area, about 180,000 square miles. The portion S. of the Pilcomayo belongs to Argentina, and the remaining third to Paraguay; but the possession of the upper section of the Pilcomayo is disputed by Bolivia. The country rises gradually from the Paraná toward the N. W. as far as 25° 40′ S. lat., when it dips to the valley of the San Francisco—part of a great depression extending through Bolivia nearly to the frontier of Peru, and subject to annual inundations. The Chaco is watered principally by two long, narrow, and tortuous streams, the Bermejo and the Pilcomayo, flowing S. E. in courses generally parallel, and about 180 miles distant from each other. The bed of the Bermejo oscillates backward and forward, and in 1870-1872 the river opened up a new channel (known as the Teuco) for nearly 200 miles. The most N. part of the Chaco is an extremely arid zone, but the banks of the upper Pilcomayo are fertile and its sands auriferous, while S. of the Bermejo the primeval forest extends into Salta. Much of the region is of modern alluvial formation, and exceedingly fertile. Since 1537, when the first explorer, Captain Juan de Ayolas, marched with 250 men into the wilderness from which none ever returned, numerous expeditions have been sent out from the surrounding countries; but the savage tribes, swamps, lagoons, and floods defeated all early attempts to open up the country. In 1884 garrisons were established along the Bermejo, and since 1885 permanent settlements have been made.

GRAND ARMY OF THE REPUBLIC, a patriotic organization in the United States composed of the National veterans of the Civil War. It was organized in Decatur, Ill., April 6, 1866, by Dr. B. F. Stephenson, of Springfield, formerly surgeon of the 14th Illinois Infantry. The establishment of Post 1 in Decatur was soon followed by Post 2 in Springfield, and in a few months other posts sprang

up in Illinois, Indiana, Wisconsin, Iowa, Missouri, and other States. The first National Convention was held in Indianapolis, Ind., Nov. 20, 1866, with delegates from 10 States and the District of Columbia. Gen. Stephen A. Hurlbut, of Illinois, was chosen commander-in-chief and Dr. B. F. Stephenson, adjutant-general. The next National Convention was held in Philadelphia, Pa., Jan. 15, 1868, when it was enacted that annual sessions should be held. The main purpose of the Grand Army of the Republic and the qualifications of its members are given in the sixth rule of the organization, which is as follows: "To maintain true allegiance to the United States of America, based on a paramount respect for, and fidelity to, its Constitution and laws, to discountenance whatever tends to weaken loyalty, incites to insurrection, treason, or rebellion, or in any manner impairs the efficiency and parmanency of our free institutions; and to encourage the spread of universal liberty, equal rights, and justice to all men. Soldiers and sailors of the United States army, navy, or marine corps, who served between April 12, 1861, and April 9, 1865, in the war for the suppression of the rebellion, and those having been honorably discharged therefrom after such service, and of such State regiments as were called into active service and subject to the orders of the United States general officers between the dates mentioned, shall be eligible to membership in the Grand Army of the Republic. No person shall be eligible to membership who has at any time borne arms against the United States." In 1919 there were about 4,700 posts, with a total membership of about 100,000.

GRAND CAÑON (kan'yon), a gorge through which the Colorado river flows in Arizona; 65 miles from Flagstaff. It is one of the natural wonders with which that country abounds. The cañon is a gorge 217 miles long, or with the addition of Marble Cañon, connected with it, 286 miles. It is from 9 to 13 miles wide and 6,300 feet below the level of the plateau. This depth is maintained for about 50 miles and surpasses that of any other cañon in the world.

GRANDCOURT, village of France, on the Ancre, which was the scene of much fighting in the battle of the Ancre in November, 1916. The Germans had constructed in the vicinity a labyrinth of trenches. The western outskirt was taken by the British but they were expelled by the Germans. Battle fluctuated over the region till the final retreat following on the arrival of Americans.

GRAND FORKS, a city and county-seat of Grand Forks co., N. D.; on the Red River of the North and the Great Northern and the Northern Pacific railroads; 25 miles N. W. of Crookston. It is the seat of the University of North Dakota, St. Bernard's Academy, and Grand Forks College; and contains a high school, 2 National banks, and daily and weeky newspapers. There are flour and lumber mills, large agricultural and lumbering industries. Pop. (1910) 12,478; (1920) 14,010.

GRAND GULF, a locality in Mississippi, on the Mississippi river, S. of Vicksburg. The Confederate batteries at this place were attacked by the forces under Farragut, March 31, 1863, and frequent shelling and bombarding occurred from that time until May 3, when the place surrendered to the land and naval forces under Grant and Porter.

GRAND HAVEN, a city of Michigan, the county-seat of Ottawa co. It is a port of entry and is situated at the mouth of the Grand River. It is on the Grand Trunk, Grand Haven, and Muskegon, and the Pere Marquette railroads. It has an excellent harbor and is connected by steamship lines with the principal lake ports. It has an important fishing industry and is the center of extensive fruit and celery-growing interests. Its industries include the manufacture of engines, printing presses, baskets, barrels, shoes, etc. Its institutions include a public library, Akeley College for girls, a United States custom house, and a county court house. In the vicinity are Highland Park and Spring Lake, which are attractive summer resorts. Pop. (1910) 5,856; (1920) 7,205.

GRAND ISLAND, a city of Nebraska, the county-seat of Hall co. It is on the Union Pacific, the Burlington Route, and the St. Joseph and Grand Island railroads. Its industries include a beet-sugar factory, cement-block factory, candy factory, wire factories, broom factories, etc. It has the railroad shops of the Union Pacific. Its notable institutions include a public library, St. Francis Hospital, and the Nebraska Soldiers' and Sailors' Home. It is the seat of Grand Island College. Pop. (1910) 10,326; (1920) 13,947.

GRAND JUNCTION, a city of Colorado, the county-seat of Mesa co. It is on the Denver and Rio Grande, the Colorado Midland, and the Grand Junction and Grand River Valley railroads, and at the junction of the Grand and Gunnison rivers. It is the center of an important agricultural region and is espe-

cially noted for its fruit growing. There are extensive coal mines in the neighborhood and its industries include machine shops, lumber yards, railroad shops, brick works, and a beet-sugar factory. Its public buildings include a public library. Pop. (1910) 7,754; (1920) 8,665.

GRAND, MME. SARAH, an English novelist; born (Frances Elizabeth Clarke) in Ireland. She married a British naval officer almost immediately on leaving school, and traveled widely. "The Heavenly Twins" made her famous. "Singularly Deluded" and "Ideala"; "Babs the Impossible" (1900); Emotional Moments" (1908); "Adam's Orchard" (1912), are among her other works of fiction. She lectured in the United States in 1901.

GRANDPRÉ, a village of France, in Ardennes, on the Aire, 36 miles S. E. of Mézières. It was at first taken by the Germans but relinquished by them following the battle of the Marne. Some of the fiercest battles of the war with the French troops were fought in the region.

GRAND PRIX DE ROME, a prize given annually by the Academy of Fine Arts in Paris to the most successful competitor in painting, music, sculpture, etc. The winners of the prize become the charge of the government for four years and are sent to Rome to reside.

GRAND RAPIDS, a city, port of entry, and county-seat of Kent co., Mich.; on both sides of the Grand river, and on the Pere Marquette, the Michigan Central, the Lake Shore and Michigan Southern, and several other railroads; 60 miles N. W. of Lansing. There is direct steamboat communication with Chicago, Milwaukee, and other cities. It is the second largest city in the State in population and commercial importance. Area, 18 square miles.

Business Interests. The Grand river at this point has a fall of 18 feet, supplying excellent water power for the extensive manufacture of school furniture, bicycles, brass goods, flour, brushes, felt, carpet sweepers and refrigerators. The gypsum quarries of Grand Rapids have the largest output in the world. In 1919 there were 3 National banks and several private banking institutions. The exchange at the United States clearing-house here amounted to $272,016,000.

Public Interests.—The city has an excellent system of streets and electric lighting and waterworks plants, both owned by the city. The noteworthy buildings include the City Hall, St. Cecelia and Peninsular Club Houses, Briggs and Blodgett Blocks, Pythian Temple, County, Federal and Y. M. C. A. buildings and numerous churches. There are many public schools and the Central High School. Among the charitable institutions are the Michigan State Soldiers' Home, Union Benevolent Home, Masonic Home, and Catholic Home. The city has a splendid system of pleasure grounds and public parks.

History.—Grand Rapids was settled in 1833 on the site of an Indian village, and incorporated as a city in 1850. Pop. (1910) 112,571; (1920) 137,634.

GRAND RAPIDS, a city of Wisconsin the county-seat of Wood co. It is on the Chicago, Milwaukee, and St. Paul, the Minneapolis, St. Paul and Sault Ste. Marie, the Chicago and Northwestern, and the Green Bay and Western railroads, and on the Wisconsin river, which is spanned by a fine bridge. Its industries include foundry and machine shops, and manufacture of paper, etc. Water power is furnished by the river. There is a hospital, a library, and several parks. The name of the city was changed to Wisconsin Rapids on August 4, 1920. Pop. (1910) 6,541; (1920) 7,243.

GRAND VIZIER (vi-zēr'), the prime minister of the Turkish Empire.

GRANGE, see HUSBANDRY, PATRONS OF.

GRANICUS (gra-nē'kus), a river of Bithynia, famous for a battle fought on its banks between the troops of Alexander the Great and those of Darius, 334 B. C., when 600,000 Persians were defeated by 30,000 Macedonians.

GRANITE, an unstratified rock, normally consisting of three simple minerals, feldspar, quartz, and mica, or, in Dana's nomenclature of orthoclase, quartz, and mica. For a long time the universally accepted view, which is still the prevalent one, was that it is an "igneous" rock, of a "plutonic" type. The difficulty has, however, to be encountered that it is not seen in process of formation on the earth's surface. This has been met by the hypothesis that it originates beneath the surface and under high pressure, produced in most cases by earth, but in some instances by a weight of incumbent water.

The production of granite in the United States in 1919 was about 4,000,000 short tons, valued at about $23,000,000. The leading States in its production are Maine, Massachusetts, Vermont, and Delaware.

GRANITE CITY, a city of Illinois, in Madison co. It is opposite St. Louis, Mo., and is on the Chicago and Alton, the Chicago, Peoria, and St. Louis, the Cleveland, Cincinnati Chicago, and St. Louis, and other railroads. It is an im-

portant industrial city and its manufactures include iron, steel, tin plate, and granite ware. It has also a large corn-products refinery, and bridge works. Among its institutions is a public hospital. Pop. (1910) 9,903; (1920) 14,757.

GRANSON, or **GRANDSON** (gron-sôn′), a village in the canton of Vaud, Switzerland, on the Lake of Neuchâtel, 21 miles S. W. of Neuchâtel. Here March 3, 1476, the Swiss defeated the Burgundians, under Charles the Bold.

GRANT, SIR ALEXANDER, a Scotch educator; born in New York, Sept. 13, 1826; educated at Harrow and Balliol College, Oxford; graduated B. A. in 1848; and was elected to an Oriel fellowship. Here he edited the "Ethics of Aristotle" (1857). He succeeded as baronet in 1856, was appointed inspector of schools at Madras in 1858, and became Professor of History in Elphinstone College there; then its principal; and afterward vice-chancellor of Elgin College, Bombay. On the death of Sir David Brewster he was in 1868 chosen as principal of the University of Edinburgh. His "Story of the University of Edinburgh" (1884) was published in connection with the latter event. He died in Edinburgh, Nov. 30, 1884.

GRANT, ANNE, a Scotch author; born in Glasgow, Feb. 21, 1755. She was the daughter of a British officer, Duncan McVicar, who became barrack-master of Fort Augustus. She married in 1779 the Rev. James Grant, formerly chaplain of the fort, minister of Laggan. Left a widow in destitute circumstances in 1801, Mrs. Grant published by subscription a volume of "Poems" (1803), which were well received; "Letters from the Mountains" (1806), a highly popular work; "Memoirs of an American Lady" (1808); and "Essays on the Superstitions of the Highlanders of Scotland" (1811). She died in Edinburgh, Nov. 7, 1838.

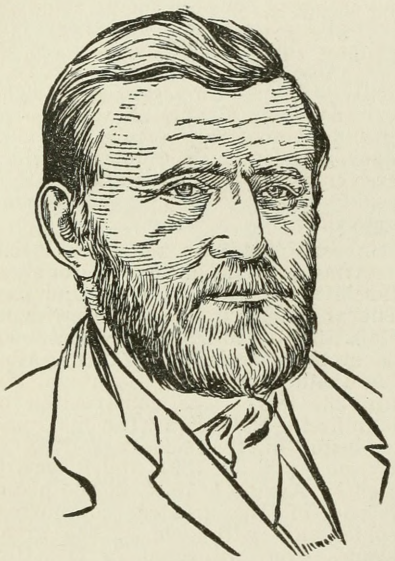
GRANT, HEBER J., First President of the Mormon Church, born in Salt Lake City, Utah, in 1856. He was educated in private schools and the University of Utah. He was engaged in business and became an officer and director of many important financial institutions. He was a member of the First Presidency of the Mormon Church and was president of the Prohibition and Betterment League, Salt Lake City.

GRANT, SIR JAMES HOPE, a British military officer; born in Kilgraston, Perthshire, Scotland, July 22, 1808. He first saw service in the Chinese war of 1842, and next distinguished himself at Sobraon, Chillianwalla, and Gujerat in the two Sikh wars. During the operations of the Indian mutiny Grant, who had risen to the rank of lieutenant-colonel, took a leading part, assisting in the recapture of Delhi, in the relief of Cawnpur, and in the retaking of Lucknow, and he commanded the force which effected the final pacification of India. In 1859 he conducted the war against China, defeating the enemy three times under the walls of Peking, assaulting the Taku forts, and finally capturing the capital of the empire, for which work he was created G. C. B. After commanding the army of Madras from 1861 to 1865, he returned to England, and was made general in 1872. He died in London, March 7, 1875.

GRANT, ROBERT, an American author; born in Boston, Mass., Jan. 24, 1852; was graduated from Harvard in 1873 and the Harvard Law School in 1879. From 1893 he was a judge of probate and insolvency for Suffolk co., Mass. Among his most popular works are: "The Little Tin Gods on Wheels" (1879); "Confessions of a Frivolous Girl" (1880); "An Average Man" (1883); "The Reflections of a Married Man" (1892); "Unleavened Bread" (1900); "The Orchid" (1905); "The Law Breakers" (1906); "The Chippendales" (1909); "The High Priestess" (1915); "Their Spirit" (1916); "Law and the Family" (1919). He also wrote the well-known boys' stories, "Jack Hall" (1887); "Jack in the Bush" (1888).

GRANT, ULYSSES SIMPSON, an American statesman; 18th president of the United States; born in Point Pleasant, O., April 27, 1822, entered West Point Academy in 1839, graduated in 1843, received a commission in the United States Army in 1845, and served under Generals Taylor and Scott in Mexico. In 1852 he was ordered to Oregon, and in August, 1853, became full captain. He resigned his commission in July, 1854, and soon after settled in business at Galena, Ill. From this privacy he was drawn out by the Civil War, and having acted first as aide-de-camp to the governor of his State in 1861, and afterward as colonel of the 21st Illinois Volunteers, was appointed a Brigadier-General in July of the same year. While in command at Cairo, he secured Paducah, and with it the State of Kentucky. In November, 1861, he fought and gained the battle of Belmont, and in January of the following year conducted a reconnoissance to the rear of Columbus. After capturing Fort Henry, on the Tennessee, General Grant pursued the Confederates to Fort Donelson. There a severe battle raged almost without interruption for

three days and three nights, when, Feb. 15, the fort was surrendered unconditionally. This brilliant feat elevated General Grant to the rank of Major-General. Having been appointed to the command of the district of western Tennessee, Grant advanced up that river to Pittsburg Landing, where he had to contend against a force of nearly 70,000 men. The National lines were overwhelmed, crushed, dispersed; but General Grant, undismayed, formed new lines, planted new batteries, and thus held the Confederates in check till dark, when the long expected arrival of his rear-guard of 35,000 men, under General Buell, enabled him to fight, April 6 and 7, the glorious battle of Shiloh, whence the Confederates, abandoning the field,



ULYSSES S. GRANT

retreated to Corinth. General Grant was second in command to General Halleck at the siege of Corinth, and when the latter was ordered to Washington, he was appointed to take command of the Department of Tennessee, in which capacity he marched against Vicksburg, the so-called "Gibraltar" of the Confederates on the Mississippi. After a long and memorable siege, this important place was surrendered unconditionally, and 37,000 prisoners, 150 cannons, with an immense amount of military stores, fell into the hands of the victors.

Upon the defeat of General Rosecrans at Chickamauga, Grant was sent to repair the disaster, and on Nov. 25, 1863, he defeated General Bragg at Lookout Mountain. This great victory, by which eastern Tennessee was reduced and Kentucky saved, was perhaps the most brilliant strategic and tactical movement of the war; it placed General Grant on a footing with the ablest generals of any country or of any age. A few months after, March 1, 1864, Grant was raised to the highest military position in the land—under the title of Lieutenant-General he was constituted commander-in-chief of all the armies of the United States. Invested with this authority, the plan of General Grant was to destroy Lee's army. Washington was to be covered from raid, through the Shenandoah, by General Sigel. General Butler was to menace Richmond from the S. Sherman, in Georgia, was to press his campaign in that department with all vigor, that no re-enforcements might be sent to the aid of Lee. General Grant, with Meade's army of 150,000 N. of the Rapidan, was to draw Lee's army out of their intrenchments and either destroy them, or compel them to rush from the menacing of Washington to the protection of their own capital. On the night of Tuesday, May 3, General Grant crossed the Rapidan, and entered what is called The Wilderness. By a flank movement, Grant was getting into the rear of his foe. Lee rushed from his intrenchments, and endeavored to overwhelm Grant. Then began the most gigantic and terrific campaign recorded in history.

After 11 days of bloody and almost uninterrupted battles, the two armies, on the 12th day of this unparalled struggle, were still confronting each other, both on the defensive, sternly looking face to face, both prepared for another round! With the first dawn the battle was renewed by a tremendous but vain assault upon the Confederate lines. General Lee, nevertheless, fearing Grant might get between him and Richmond, cutting off his supplies, decided to retire, and Grant succeeded in crossing the North Anna, and reached the famous banks of the Chickahominy. Finding the intrenchments of the enemy in his front too formidable to be carried by direct assault, Grant moved his troops to join General Butler at Bermuda Hundred. The performance of this movement, in the presence of Lee's army, who at many points were but a few rods from him, is perhaps one of the most brilliant pages of General Grant's military career. Slowly wore away long months of expectation on the part of an impatient people.

Impenetrable to jealousy, he had but one aim, one thought—the grasping of Richmond; but the time was not yet come. With the coming of the spring

of 1865, Lee, whose position and resources were quite exhausted by the self-possession and strategy of the Union commander-in-chief, now determined to assume the offensive, and on the night of March 27, 1865, he massed three divisions of his troops in front of Fort Steadman, and on Grant's right, and by a sudden rush at daybreak on the following morning, succeeded in surprising and capturing that important position. Before noon of the same day, however, it was retaken by the Union troops, with all its guns and 1,800 Confederate prisoners. At this time a battle, which continued until evening, was raging at Hatcher's Run. Three corps were massed under General Sheridan below Petersburg, and on Sunday morning, April 2, flanked the Confederates at Big Five Forks, capturing their intrenchments with 6,000 men. The attack, under General Grant's direction, then commenced along the whole line, and the assault was so successful that on the same night his forces held the Confederate intrenchments from the Appomattox, above Petersburg, to the river below. At 3 o'clock that afternoon General Lee telegraphed to Jefferson Davis that he had been driven from his intrenchments, and that Petersburg and Richmond must be abandoned, which operation was performed that night; and on the next day, April 3 1865, the National army entered Petersburg, and General Weitzel occupied Richmond. By rapid movements, General Grant cutting off Lee's retreat to Lynchburg and Danville, came up with him at Appomattox Courthouse, and demanded his immediate surrender. The two chiefs met and arranged the details, and on Sunday, April 9, the Army of Northern Virginia capitulated. The whole of General Lee's army, officers and men, were paroled, with permission at once to return to their homes. The former were granted the privilege of retaining their side-arms, and each of the field-officers one horse. All other property belonging to the Confederate government within the department was surrendered to the United States.

In 1866 General Grant was promoted to the rank of General, that honor being created specially for him. In August, 1867, on the suspension of Mr. Stanton by President Johnson, General Grant consented to fill the office of Secretary of War ad interim, but the Senate having refused to approve the suspension, General Grant, Jan. 13, 1868, surrendered the office to Mr. Stanton. On June 20, 1868, General Grant was unanimously nominated by the Republicans as a candidate and elected the following November President of the United States, in which capacity he served till 1877, being re-elected at the end of his first term.

On May 17, 1877, accompanied by his wife and one son, he sailed from Philadelphia, Pa., for a tour around the world. Not only did he receive a grand farewell from his own countrymen, but when he arrived in the Mersey River, England, the ships of all nations gathered there displayed their flags to greet him. In England a grand reception was accorded him in every city he visited. He was received by Queen Victoria and the Prince of Wales in London, and later visited the Queen at Windsor Castle. After visiting the other countries of Europe and being entertained by all the crowned heads, the United States man-of-war "Vandalia" was placed at his service and on board her he made a cruise of the Mediterranean Sea. He then visited Bombay and Calcutta in India, Hong Kong, Canton and Peking in China, and finally Japan. On Sept. 20, 1879, he arrived at San Francisco, where a magnificent demonstration was made in his honor, and during his route E. he was given public receptions and greeted with every mark of honor wherever he stopped.

He was placed on the retired list of the army by a special act of Congress in March, 1885, with the rank and pay of General. During the last few months of his life he wrote his "Memoirs," which was published soon after his death, on Mount McGregor, near Saratoga, N. Y., July 23, 1885. The construction of a magnificent mausoleum for his remains was begun in Riverside Park, New York City, on April 27, 1891, and it was dedicated on April 27, 1897, in the presence of one of the greatest concourses of people and with one of the greatest parades ever witnessed in the United States. The mausoleum exclusive of steps and portico projections is about 100 feet square at the base and the height 160 feet from the ground and nearly 300 feet from the level of the Hudson river. There is an outer gallery 130 feet above the base from which the country may be seen for miles around.

GRANTHAM (grant'am), a parliamentary borough of Lincolnshire, England, on the Witham river, 25 miles S. S. W. of Lincoln. It lies on the ancient Ermine street; is an important junction on the Great Northern railway; and a canal, 30 miles long, connects it with the Trent near Nottingham. Among the notable buildings is the St. Wolfran's Church, in style, mainly Early English of the 13th century. The quaint Angel Inn is still standing, in which Richard

III. signed Buckingham's death warrant. Oliver Cromwell here, May 13, 1643, won his first success; but the town's greatest glory is Sir Isaac Newton, who, during 1655-1656, attended its grammar school. A bronze statue of him by Theed was erected in 1858. The school was founded by Bishop Fox in 1528. The manufacture of agricultural implements, malting, and brick-making are the chief industries. Grantham was incorporated by Edward IV. in 1463. The borough boundary was largely extended in 1879. Pop. about 20,000.

GRANVILLE (gron-vēl'), a seaport in the department of La Manche, France, on a rocky promontory on the English Channel, 23 miles N. E. of St. Malo. The 15th-century church and a hydrographic college are the principal institutions. The town was captured by the French in 1450, and the English in 1695, and unsuccessfully besieged by the Vendéans in 1793, and the English in 1803. Pop. about 12,000.

GRANVILLE, EARL See CARTERET.

GRANVILLE, GEORGE LEVESON-GOWER, 2nd EARL, an English statesman; born in London, May 11, 1815; educated at Eton and Oxford, and entered Parliament in 1836 as member for Morpeth, exchanging that seat for Lichfield in 1840. He succeeded to the peerage in 1846, and five years later entered the cabinet of Lord John Russell, holding the seals of the Foreign Office. From that time forward he held office in every Liberal ministry. He became president of the Council in 1853, and leader of the House of Lords in 1855. He labored arduously in connection with the great exhibitions of 1851 and 1862. Lord Granville was charged to form a ministry in 1859; but having failed to do so he joined Lord Palmerston's second administration. He retired with Earl Russell in 1866, having the preceding year been made Lord Warden of the Cinque Ports. In December, 1868, he was appointed Colonial Secretary in Mr. Gladstone's first ministry, and on the death of Lord Clarendon in 1870 became Secretary for Foreign Affairs. He arranged the treaty between England, France, and Prussia guaranteeing the independence of Belgium; and confirmed with Prince Gortchakoff the agreement that Afghanistan should form an intermediary zone between England and Russia. In 1880 he again became foreign secretary under Mr. Gladstone, and displayed considerable diplomatic skill in matters relating to the Berlin treaty, the occupation of Tunis, and the revolt of Arabi Pasha in Egypt. He retired with his chief in 1885, but returned once more to office as colonial secretary in 1886, resigning again with his colleagues in August of the latter year. He died in London, March 31, 1891.

GRAPE, the fruit of *Vitis vinifera*, or the plant itself. The native country of the vine is the region round the Caspian Sea, extending through Armenia as far W. as the Crimea. It has been cultivated from the remotest antiquity (Gen. ix: 20). It flourishes in Turkey, Greece, Italy, Spain, France, Germany, Great Britain, and the United States. Bear's grape is *Vaccinium arctostaphylos*, also *Arctostaphylos uva ursi*; the Corinth grape is the black Corinth variety of *Vitis vinifera*, the one which furnishes dried currants; the sea-grape is *Ephedra distachya*, also *Sargassum bacciferum;* and the seaside grape *Coccoloba uvifera*.

GRAPHITE, a hexagonal mineral, crystallizing in flat six-sided tables. Color, iron-black to dark steel gray, with a metallic luster and a black shining streak. Composition: Carbon, either pure with an admixture of iron, or occasionally of silica, alumina, and lime. It is popularly called black lead, though there is no lead in its composition. The product is used for the manufacture of pencils, lubricants, paint, stove blacking, crucibles, and foundry facings. The chief sources of supply are Ceylon, and, prior to the World War, Austria-Hungary. It is also found in the United States, Canada, Mexico, Japan, and other countries. The production in the United States in 1919 was about 7,434,000 pounds, valued at $696,000. This came chiefly from Alabama, New York, and Pennsylvania.

GRAS, FELIX, a Provençal poet; born in Malemort, France, May 3, 1844; became a lawyer and "juge de paix" in the department of Vaucluse, and one of the leading Provençal writers, standing next in popular estimation to Mistral. His most famous works are: the "The Reds of the Midi," and its sequel, "The Terror," stories of the French Revolution, translated into English by Mrs. T. A. Janvier: "Li Carbouniè" (1876); "Toloza" (1882), epic poems; "Lou Roumancero Prouvençau" (1887), shorter poems; "Li Papalino" (1891), Avignon stories. He was editor of the "Armana Prouvençau," a literary annual; and after 1891, the "Capouliè," or official head, of the "Félibrige," the society of Provençal men of letters. He died in Avignon, March 4, 1901.

GRASS, the botanical order *Graminaceæ*, a very extensive and important

order of endogenous plants, comprising about 250 genera and 4,500 species, including many of the most valuable pasture plants, all those which yield grain, the sugar-cane, bamboo, etc. In its popular use the term grass is chiefly applied to the pasture grasses as distinct from the cereals, etc.; but it is also applied to some herbs, which are not in any strict sense grasses at all, *e. g.*, ribgrass, scurvy, and whitlow grass.

GRASS HEMP. See SISAL.

GRASSHOPPER, the name of various leaping insects of the order *Orthoptera* nearly akin to the locusts. They are characterized by very long and slender legs, the thighs of the hinder legs being large and adapted for leaping, by large and delicate wings, and by the wing-covers extending far beyond the extremity of the abdomen. Grasshoppers form an extensive group of insects, and are distinguished by the power which they possess of leaping to a considerable distance, and by the stridulous or chirping noise the males produce by rubbing their wing covers together.

GRATIAN (grā'shan), a Roman emperor; eldest son of Valentinian I., by his first wife Severa; born in Pannonia 359 A. D.; elected by his father to the rank of Augustus, 367. On the death of Valentinian, 375, the troops elevated Gratian to the throne, giving him at the same time as a colleague his half-brother Valentinian II. During the first part of his reign, a fierce warfare was carried on against the tribes who possessed the Danubian provinces and Illyricum; and he was on the point of marching into Thrace, to assist his uncle Valens against the Goths, when he was suddenly called upon to defend his dominions against the Lentienses, a tribe of the Alemanni. After the invaders had been defeated, Gratian advanced toward the Eastern Empire, but while on the way he learned that his uncle Valens had been defeated and killed by the Goths near Adrianople, 378. The sovereignty of the Eastern Empire then devolved on Gratian, but feeling his inadequacy to the task of ruling the whole empire, he recalled Theodosius from Spain, and appointed him his colleague, 379. Gratian possessed some admirable virtues; but his fondness for frivolous amusements and unworthy associates excited the contempt of the army, so that when Maximus was proclaimed emperor by the legions in Britain crowds of the disaffected flocked to his standard. Gratian was defeated by him near Paris, and afterward fled to Lyons, where he was overtaken and killed, 383.

GRATTAN, HENRY, an Irish statesman; born in Dublin, July 3, 1746; graduated at Trinity College, and went to London to study and practice law. In 1772 he was called to the bar in his native country, and three years after entered the Irish House of Commons, where his brilliant eloquence soon raised him to distinction. In 1780, the British Parliament having attempted to frame laws for the sister country, to the humiliation of the Irish Parliament and executive, Grattan moved the resolution, "That the King's most excellent Majesty, and the Irish House of Lords and Commons, are the only competent powers to make laws to govern Ireland." So enthusiastic was the national feeling on this occasion that he was voted the sum of $500,000. Of this, however, Grattan refused to accept more than $250,000. On the union of the two crowns, at the opening of this century, Grattan took his seat in the Imperial Parliament, first for Malton, and afterward for Dublin; but, like most of these great orators, the change from College Green to St. Stephen's seemed fatal alike to his eloquence, his prestige, and his power. He died in London, June 4, 1820.

GRATZ (grāts), a city and capital of Styria, Austria, 141 miles S. S. W. of Vienna. It is a picturesque old town, built on both sides of the Mur. Of the former fortress, erected on a hill in the center of the town, and dismantled in 1809 by the French, two towers and other remains still exist. The town itself contains several old buildings, as the Late Gothic cathedral (1462), two other Gothic churches (one built in 1283), the ancient castle of the Styrian dukes, the Landhaus, where the nobles of the duchy held their meetings, the university, originally founded in 1586, an armory, palaces of the Styrian nobles, and four monasteries dating from the 16th and 17th centuries. There are also national archives, a cabinet of coins and antiquities, a technical school (Johanneum), and a botanic garden. Prior to the World War the most important of its many industries were the manufacture of machines, steel goods, rails and railway carriages, sugar, wine, perfumery, stearine candles, soap, etc. Fat capons, biscuits, and chocolate figured prominently as articles of trade. Gratz was a favorite place of residence for Austrian officials retired from service. The town is mentioned in the annals as early as 881. In 1481 it repulsed the Hungarians from its walls, and in 1532 the Turks. In 1797, and again in 1809, it was occupied by the French. Pop. about 152,000.

GRAUDENZ (grou'dents), a town in the province of West Prussia, Germany; on the Vistula, 37 miles N. of Thorn. It carries on a trade in corn, wool, and cattle, and has iron foundries, breweries, and tapestry and cigar manufactories. About a mile N. of it on a hill is the fortress of Graudenz, built in 1776, and successfully defended against the French in 1807. It was maintained as a fortress till 1874, and now serves as a barrack and military prison.

GRAVEL, small pebbles, stones, or fragments of stone, intermixed with sand loam, clay, flints, etc., formed by the action of water upon disintegrated portions of rock.

In pathology, the presence of minute concretions in the urine. It is usually owing to the presence of uric acid, urates, oxalates, and phosphates. Among exceptional urinary calculi are carbonate of lime, cystine, xanthine, fatty and fibrinous concretions. The chief symptoms are dull, aching pains over the renal regions, extending to the thighs.

GRAVELINES (gräv-lēn'), a town in the department of Nord, France; at the mouth of the Aa, 13 miles E. N. E. of Calais. Considerable historical interest is attached to the place, as the scene of Egmont's victory over the French (1558), and the place off which the English dispersed the Armada (1588). It was taken by the French in 1644, retaken by the Austrians after a 10 weeks' siege in 1652, and finally recaptured in 1658 by Louis XIV., who had it fortified by Vauban. Pop. about 6,000.

GRAVELOTTE (gräv-lot'), a village of Lorraine, 7 miles W. of Metz. There, on Aug. 18, 1870, the French under Bazaine sustained a severe defeat by the Germans.

GRAVESEND, a port and borough of Kent, England, on the Thames, 24 miles E. S. E. of London. It consists of the old town, with narrow, irregular streets, and of the handsome new town on the high ground. In the vicinity are extensive market gardens; and many of the inhabitants are employed in fishing. Gravesend forms the limit of the port of London; and here pilots and custom-house officers are taken on board of vessels going up the river. It carries on some shipbuilding, iron-founding, soap-making, and brewing, and a considerable trade in supplying ships' stores. Gravesend was incorporated under Elizabeth; was originally a hythe, or landing-place; and is mentioned as such in Domesday. Here the fleets of early voyagers, as that of Sebastian Cabot in 1553, and of Martin Frobisher in 1576, assembled, and here the lord mayor, aldermen, and city companies of London were wont to receive all strangers of eminence and to conduct them up the river in state. Pop. about 30,000.

GRAVITY, in physics, the terrestrial gravitation, the operation of the law of gravitation on the earth, specially in making heavy bodies fall in all parts of the planet in the direction of its center. Newton and Bessel have shown that in a vacuum a sovereign and a feather will fall with equal speed, though the rate will be very different in the atmospheric air. The attraction of the whole earth, considered as a sphere, on a body at its surface, is the same as if the whole matter of the earth were collected at its center. The attraction of the earth on a body within its surface is the same as if the spherical shell situated between the body and the earth's surface was removed; or is the same as if all the matter situated nearer to the earth's surface than the body was collected at the center, and all the matter situated at a greater distance was removed. The weight of a body is proportioned to the attraction which it exerts, hence gravity in many cases means simply weight.

GRAVITY, CENTER OF. See CENTER OF GRAVITY, under CENTER.

GRAVITY, SPECIFIC, in physics, the relative density of a substance; the weight of a body compared with that of another body having the same magnitude. To obtain this, it is first weighed in air, which shows its absolute weight. Next it is weighed in water, to show how much it loses in this element. There have now been ascertained the absolute weights of two bodies of equal bulk—viz., the one experimented on, and water, and the ratio of these weights is that also of their specific gravities. Let 1 be the weight of water, and first let the body be heavier than that liquid, then the weight which it loses in water is to the absolute weight as 1 to the specific gravity required. If lighter than water, then as the weight of the body in air, plus the weight needful to make it sink in water, is to its weight in air, so is 1 to the specific gravity. On this principle are constructed such instruments as Nicholson's portable balance. In solids and liquids the standard is generally distilled water; for the gases, atmospheric air. Specific gravity is proportionate to density, and the words may be used almost interchangeably.

GRAY, a town in the department of Haute-Saône, France, on the Saône, here crossed by a stone bridge of the 13th cen-

tury; 25 miles N. W. of Besançon. It has remains of an ancient castle of the dukes of Burgundy, some trade in corn, flour, and iron, and iron industries and boatbuilding.

GRAY, ASA, an American botanist; born in Paris, Oneida co., N. Y., Nov. 18, 1810. He took his degree of M. D. in 1831, but soon relinquished the practice of medicine, and devoted himself to botany. In 1834 he received the appointment of botanist of the United States exploring expedition to the S. seas; but, as a long delay took place before it was ready to sail, he resigned his post in 1837. He was afterward elected Professor of Botany in the University of Michigan, but declined the appointment, and in 1842 became Fisher Professor of Natural History at Harvard. In 1873 he retired from the chair, but still retained charge of the great herbarium he had presented to the university in 1864; and in 1874 he succeeded Agassiz as a regent of the Smithsonian Institution. He ranked among the leading botanists of his age, and became an influential supporter of the Darwinian theories of evolution. He wrote: "Flora of North America" (begun with Dr. Torrey, in 1838); "Flora of North Eastern America, Illustrated" (1848-1850); memoirs on the botanical results of several government exploring expeditions; a number of text-books; "A Free Examination of Darwin's Treatise" (1861); "Darwinia" (1876); and "Natural Science and Religion" (1880). He died in Cambridge, Mass., Jan. 30, 1888.

GRAY, ELISHA, an American inventor; born in Barnesville, O., Aug. 2, 1835; was educated at Oberlin College. He designed a self-adjusting telegraph relay in 1867 and a little later invented the telegraphic switch and annunciator for hotels, the telegraphic repeater, the private telegraph line printer, etc. In 1876 he claimed the invention of the telephone, but after a notable contest the courts decided in favor of Alexander Graham Bell. In 1893 Professor Gray brought out his telautograph, by which written messages could be transmitted over the telephone and the telegraph. He was the founder of the Gray Electric Company in Highland Park, Ill., and in 1893 organized and was chairman of the Congress of Electricians at the World's Columbian Exposition. His publications include "Experimental Researches in Electro Harmonic Telegraphy and Telephony" (1878) and "Elementary Talks on Science." He died in Newtonville, Mass., Jan. 21, 1901. See BELL, ALEXANDER GRAHAM.

GRAY, HORACE, an American jurist; born in Boston, Mass., in 1829; was graduated at Harvard in 1845, and its law school in 1849; admitted to the bar in 1851; appointed reporter of the Massachusetts Supreme Court in 1854, and served till 1862; associate-justice of the Massachusetts Supreme Court, 1864-1873, and chief-justice, 1873-1881, when he was appointed successor to Judge Clifford in the United States Supreme Court. He died in 1902.

GRAY, THOMAS, an English poet; born in London, England, Dec. 26, 1716. He was educated at Eton, and Peter House, Cambridge, and entered at the Inner Temple, with a view of studying for the bar. Becoming intimate, however, with Horace Walpole, he accompanied him in his tour of Europe; but they parted at Reggio, and Gray returned to England in 1741. In 1747 his "Ode on a Distant Prospect of Eton College" appeared; and it was only in consequence of the printing of a surreptitious copy, that, in 1751, he published his "Elegy Written in a Country Churchyard." He declined the office of laureate on Cibber's death, in 1757; and the same year published his odes "On the Progress of Poesy" and "The Bard." In 1768 the Duke of Grafton presented him with the Professorship of Modern History at Cambridge. He was a man of extensive acquirements in natural history, the study of ancient architecture, etc.; his correspondence places him among the best English epistolary writers. He died in Eton, England, July 30, 1771.

GRAY FIBERS, in anatomy, pale gray fibers found with or without white ones in the sympathetic or other nerves; they were first discovered by Remak, and are often called after his name.

GRAY FRIARS. See FRANCISCAN.

GRAYLING, a genus of fresh-water fishes of the salmon family, distinguished from trout, etc., by the smaller mouth and teeth, and by the long, many-rayed dorsal fin. The genus is represented by five species, inhabiting clear streams in north Europe, Asia, and North America. The British grayling has a wide but local distribution. The back and sides are silvery gray, with longitudinal dusky streaks; the dorsal fin is crossed by rows of spots. Another well-known species is *Th. signifer*, a beautiful fish from the affluents of the Mackenzie river, called "Hewlukpowak," or "fish with the win-like fin," by the Eskimos, and "poisson bleu" by the Canadian voyageurs.

GRAY OWL, the tawny-owl of northern Europe and of North America.

GRAYSON, CARY TRAVERS, an American naval officer, born in Culpeper co., Va., in 1878. He studied at William and Mary College and at the University of the South. In 1904 he graduated from the United States Naval Medical School. He served as surgeon in the Navy and acted as personal physician to President Wilson. He was appointed medical director with the rank of rear admiral, in 1916. During the World War he was a member of many important organizations, including the Council of National Defense. He accompanied President Wilson to Paris at the meetings at the Peace Conference.

GRAY'S PEAK, a peak in the Colorado range, in Colorado, and one of the highest in the Rocky Mountains. Its height is 14,341 feet.

GREASE, in mineralogy, a term used in relation to luster; fat quartz has a greasy luster. In farriery, a swelling and inflammation of the legs of a horse, attended with the secretion of oily matter and cracks in the skin.

GREAT AMERICAN DESERT, a term formerly used to designate the arid parts of the West. It is now used only in historical reference. A large part of the region which formerly bore this designation has been reclaimed through the construction of railroads, the development of its abundant mineral resources, the foundation of permanent agricultural communities, and the irrigation of vast stretches of waste land.

The topography, scenery, and geological structures are extremely varied. The climate, though excessively hot in many parts, is, generally speaking, healthful and enjoyable, as the excessive heat is much tempered by the dry atmosphere. The boundaries of the Great American Desert, of course, can be indicated only in a general way. They are the Rockies, and the mountain ranges continuing from the Rockies in New Mexico and Texas on the east, and the Sierra Nevadas and Cascade ranges on the west. Roughly speaking, the country included between these, some 700 miles across at its greatest width, and extending from British Columbia in the north to the Mexican border in the south, forms the Great American Desert, although a region of similar aspect is to be found south of the Mexican frontier. However, only a part of the region thus indicated actually consists of arid country, and the total area is estimated at about 550,000 square miles within the United States, and a somewhat smaller area in Mexico. The desert parts lie at various altitudes, ranging from below the level of the sea to the extreme elevations of 13,000 feet, but averaging between 2,000 and 4,000 feet. The most extensive stretches of waste lands are included within the Great Basin, possessing an area of 210,000 square miles and containing the larger part of the State of Nevada and parts of California, Utah, Idaho, and Oregon. Perhaps the best known part of the Great American Desert is the so-called Colorado Plateau, with its famous Colorado cañyon. Other well known deserts are Death Valley in eastern California, the Salton Desert in southern California, the Black Rock Desert in northwestern Nevada, etc. The water resources of the region are very limited, considering its vast extent. Such resources, however, as are available, have been extensively developed for irrigation, especially in recent years. Vegetation is comparatively limited. Various kinds of grasses known as bunch grass, as a result of their habit of growing in tufts, are to be found in most of the deserts. Numerous members of the cactus family are abundant, especially the prickly pear. In the south the giant cactus abounds, frequently reaching a height of 30 to 40 feet. Sagebrush, yucca, and mesquite are other characteristic desert forms.

GREAT BARRINGTON, a town of Massachusetts, in Berkshire co. It is on the New York, New Haven and Hartford railroad, and on the Housatonic river. The town includes the villages of Housatonic and Van Deusen. It is situated in the Berkshires and is notable for its picturesque scenery. It is a popular summer resort. It has public libraries, several schools, and other public buildings. Its industries include the manufacture of cotton, electrical apparatus, paper, etc. Pop. (1910) 5,926; (1920) 6,315.

GREAT BEAR LAKE, a large sheet of water in the basin of the Mackenzie river, northwest Canada. It derives its name from the fact that it lies partly within the Arctic Circle, beneath the Great Bear constellation. It is about 250 miles east of the Rockies, covers an area of about 12,000 square miles, and has very irregular shores. Its surface is frozen during six months of the year, but in summer it is peculiarly clear and abounds with many varieties of fish.

GREAT BRITAIN AND IRELAND, UNITED KINGDOM OF, a kingdom of western Europe, consisting of the islands of Great Britain, including England, Scotland, and Wales, Ireland, the Isle of Man, Shetland and Hebrides,

Orkney, Scilly and other groups of small islands; area, 120,979 square miles; capital, London; pop. (1911) 45,370,530; (1919 est.) 45,267,000.

Topography.—The N. of the island of Great Britain is mountainous, the region N. of the Clyde being known as the Highlands. This is divided into two sections by the hollow of Glenmore, S. of which are Ben Nevis (4,406 feet) and Ben Macdhui (4,296 feet), the highest mountains of the islands. S. of the Highlands and separated from them by the plain of the Forth and Clyde are the Southern Highlands and the Cheviot Hills on the border between Scotland and England. Running S. through England are the Cumberland and Cambrian ranges terminating beyond the Peak of Derby. The Cambrian range extends into Wales with its highest peak, Mount Snowdon (3,571 feet). The surface of the remainder of England consists of undulating hills. In Ireland the most marked feature is the expanse of bogs which stretches over its interior. This flatness of the interior is caused by the fact that most of the mountain masses attain their greatest elevation near the coast and rapidly decline as they recede from it. Carn Tual, in the S. W., the culminating point of the island, is 3,404 feet high. With the exception of the Clyde and Severn, the rivers of the W. part of Great Britain are of little importance. These two rivers run through valleys parallel to the coast. There are several important rivers entering the sea on the E. coast. The most important river in England, if not in the world, commercially, is the Thames, 215 miles long. Other notable streams in the E. are the Spey, Don, Tay, Dee, Forth, Tweed, Tyne, Ouse, and Trent. The rivers of Ireland have winding courses and with the exception of the Shannon (225 miles) are unimportant. The lakes of the British Isles are distinguished for beauty rather than size; the largest, but among the least interesting, is Lough Neagh, in the N. of Ireland. While both Great Britain and Ireland are provided with numerous streams, which are either themselves navigable or act as the feeders of canals, the coasts, with a development of over 3,000 miles, supply a number of excellent harbors invaluable to the commerce of the country.

Geology.—The surface of Great Britain exhibits deposits of nearly all geological periods. The Palæozoic strata covers nearly one-third the entire area, the oldest rocks being the granites and gneisses of the Hebrides. Cambrian deposits exist in the sandstones, slate and grit stones of Scotland, England and Wales, the Silurian in the Cambrian Mountains and in Wales, and the Devonian, in Devonshire and Central Scotland. The Carboniferous series occupies a belt extending from the Bristol Channel to the Cheviot Hills, thence into Scotland, with 14 distinct coal fields. Permian deposits of magnesium limestone, red sand, tin and marble exist in Durham, Devon, and Cornwall. Triassic measures, including beds of rock salt, may be traced as a ribbon from Hartlepool in the N. to the mouth of the Exe in the S. In the S. E. are many Cretaceous rocks rich in fossils, with chalk hills from Flamborough Head in Yorkshire to Hants, then toward the British Channel, forming the well-known cliffs of Dover. Tertiary formations are found along the S. coast, consisting of clays, marls, and ferruginous sands. Granites, syenite, basalt and other eruptive rocks, are found in Devon, Cornwall, the N. of Scotland, and on the Irish coast.

Agriculture.—The total amount of arable land in Great Britain in 1918 was 21,221,000 acres. There were planted in 1919 in corn, 10,093,243 acres, in green crops (vegetables), 3,894,590 acres; in flax, 115,039 acres; in hops, 16,780 acres; and in small fruit, 84,632 acres. The land lying fallow was 658,443 acres. The land planted to clover and other grasses is about 5,000,000 acres, and the permanent pasture land amounts to about 25,000,000 acres. There were in 1919 1,914,933 horses, 12,491,427 cattle, 25,119,220 sheep, and 2,925,093 pigs. In England and Wales the Board of Agriculture makes grants for the supervision of vocational education, of scientific research, and agriculture. There are eight Development Commissioners appointed to advise the treasurer in the administration of a national fund for the development of agriculture, fisheries, forestry, and similar resources of the United Kingdom. In 1918 there were imported 57,947,610 cwt. of wheat. Of this 24,757,610 cwt. were from the United States and 15,968,700 cwt. from Canada. There were in 1918, in England and Wales, 420,126 farms; in Scotland, 75,982; and in Ireland, 572,574. The greater number of farms were from 5 to 50 acres in extent.

Fisheries.—Fishing is one of the most important industries of the United Kingdom. In 1918 the fish, excluding shell fish taken, amounted to 431,351 tons, valued at $21,019,000. The value of the shell fish was $543,082. The total number of fishing boats is about 25,000, with a tonnage of about 400,000. Over 100,000 persons are employed in the fishing industry. In 1919 there were imported

147,000 tons of fresh, cured or salted fish, while the exports of fish amounted to 136,000 tons.

Mineral Production.—The total mineral production in 1918 was 273,988,449 tons, valued at $257,079,792. Coal is the most valuable of the mineral products. The coal production in 1918 was 227,748,654 tons, valued at $238,240,760. Iron production is second in value. There were produced in 1918 14,613,032 tons of iron ore, valued at $7,106,656. Other important mineral products are limestone, chalk, clay and shale, oil shale, salt, and tin. The total number of persons employed in the mines in 1918 was 1,029,688. The total number of mines was 3,277. The principal coal fields of the United Kingdom are in Durham, Yorkshire, Clamorgan and Scotland. The greatest production is from the York, Derby, and Nottingham coal fields, which run along the eastern flank of the Southern Pennines. There were exported in the first nine months of 1919, 32,100,000 tons of coal, valued at $71,800,000. There were imported in 1919, 5,202,707 tons of iron ore valued at $11,207,244. The greatest part of this came from Spain. There were in 1918 318 blast furnaces in operation. The ore smelted amounted to 22,544,064 tons, and the pig iron made amounted to 9,107,384 tons. The output of pig iron in 1919 was 7,370,000 tons, and of steel ingots 7,880,000 tons.

Manufactures.—There were consumed in the three-year period 1917 to 1919, in textile manufactures, 1,623,000,000 pounds of cotton, 835,000,000 pounds of wool, 121,000,000 pounds of flax, or a total of 2,579,000,000 pounds. The value of the products exported was: cotton, 189,000,000 pounds; woolen goods, 68,800,000 pounds; linen goods, 14,100,000 pounds; or a total of 271,900,000 pounds. The home production of wool in 1919 was 116,000,000 pounds; that of flax, 31,000,000 pounds. The exports in 1919 were: cotton, 3,611,000 yards; woolens, 175,000,000 yards; linen, 77,000,000 yards; cotton yarn, 163,000,000 pounds; woolen yarn, 29,000,000 pounds, and linen yarn, 13,000,000 pounds. The metal industry ranks next in importance to the textile. Engineering and metal working schools are, generally speaking, in the neighborhood of the coal fields, especially on the northeast coast and at Sheffield, London, Birmingham, and Coventry, in England; on the Clyde, in Scotland; and in Belfast, in Ireland. The leather industry is important at Bristol, Leicester, Northampton, and Nottingham. The earthen and china district is in the South Staffordshire coal fields, where there are also supplies of coarse clay and iron stone. Paper making, printing and brewing are of great importance, and distilling is carried on on a large scale in Scotland and Ireland.

Commerce.—The value of the imports of merchandise in 1919 was £1,631,901,864, compared with £1,316,150,903 in 1918, and with £768,734,739 in 1913. The total exports in 1919 amounted to £962,694,911, compared with £532,364,078 in 1918, and £634,820,326 in 1913. The imports in 1919 may be divided as follows: food, drink and tobacco, £712,439,000; raw materials, £646,451,000; manufactured articles, £266,746,000. The largest class of exports was in the latter class, manufactured articles. The total imports from the countries of the British dominions in 1918 amounted to £423,034,971, and the total exports to British dominions amounted to £183,453,454. The imports from other countries in the same year amounted to £893,115,932. The exports to other countries were £348,910,621. The countries from which the largest number of imports were received were the United States, Argentina, France, Norway, Spain, Sweden, Japan, Cuba, and Chile. The chief exports were to France, Italy, United States, Argentina, Netherlands, China, and Brazil.

Shipping and Navigation.—There were in 1917 7,186 sailing vessels of 625,428 net tons, and 11,534 steam vessels measuring 9,606,601 tons, registered as belonging to the United Kingdom. The output of merchant shipbuilding in 1918 was 1,310,741 tons. The total loss to the United Kingdom merchant shipping from the outbreak of the World War in August, 1914, to the end of October, 1918, was 9,031,828 gross tons. New construction during that period amounted to 4,342,296 gross tons; purchases numbered to 530,000 gross tons and enemy tonnage captured, to 716,520 gross tons, making a net loss of 3,443,012 gross tons.

Transportation.—The total length of railways at the end of 1915, the latest date for which statistics are available, was 23,709 miles. The total capital of English railways at the end of 1917 was £1,122,655,000; of Scottish railways, £187,801,000; and of Irish railways, £309,678,000. In 1918 there were 1,202 miles of waterway in England, and 304 miles in Ireland, under the Canal Control Committee. In addition, the Railway Executive Committee controlled 1,025 miles in England and Wales. The total traffic conveyed by canals is about 35,000,000 tons per year. The most im-

portant canal is the Manchester Ship Canal, which is 35½ miles in length. The gross revenue of this canal in 1919 was £1,976,591. There are about 25,000 post offices in the United Kingdom. The total mileage of telegraph wire in 1917 was 3,375,247. The total number of telegraph offices open in that year was 14,035.

Education.—In England and Wales parents are required to compel their children to receive sufficient elementary education or to attend school from 5 to 14 years of age. In Scotland efficient education is required up to 15 years, and in Ireland from the ages of 6 to 14. Local authorities are in power to make free accommodation, attendance of pupils, and teaching staffs, while the State supplies nearly one-half of the maintenance funds, conditional upon receipt of satisfactory reports from government inspectors. There are about 33,000 local schools. The teachers number about 200,000. The number of scholars in the local schools in 1918 was about 6,000,000 in England and Wales. The average attendance in Scotland in 1917 was 743,725, and in Ireland, 488,785. Secondary and technical education is provided under the Education Act of 1918, by which county and borough councils are required to provide for the progressive development and comprehensive organization of education. Continuation schools are to be established, and courses in physical training and vocational education are made availble. There were in 1918, 1,061 secondary schools in England and Wales, with 238,314 full time pupils. Higher education is given in the Universities of Oxford and Cambridge, the University of Durham, Victoria University at Manchester, Birmingham University, Liverpool University, Leeds University, Sheffield University, and Bristol University. There are also special and technical colleges in other cities. The University of Wales has three colleges at Cardiff, Aberystwyth, and Bangor. There are four universities in Scotland, at St. Andrew, Glasgow, Aberdeen, and Edinburgh. In Ireland are the University of Dublin, Queens University of Belfast, and the National University of Ireland. There were in the colleges of England in 1919-20, 28,010 students, in Scotland, 10,140 students; in Ireland, 4,200; and in Wales, 2,500; or a total of 44,850.

Finances.—The revenue for the fiscal year ending March 31, 1920, was £1,339,571,381, and the expenditure was £1,665,772,928. The estimated revenue for 1921 was £1,418,300,000, and the estimated expenditure, £1,184,102,000. The chief sources of revenue are customs, excise, taxation, and the sale of stamps. The chief expenditures are for the army and navy, and civil service. Included in the latter are about £56,000,000 for public education, about £26,000,000 for old age pensions, and about £123,000,000 for pensions. The national debt on November 30, 1919, was approximately £7,976,900,000. The estimated total national debt on March 31, 1920, was about £8,075,000,000. This debt was incurred chiefly for expenses in the World War, and against the total is about £2,626,000,000 due from the Allies for repayment of loans and from the dominions of the Empire. The total charges on the debt amounted to about £316,000,000 annually.

Army and Navy.—See ARMY and NAVY, THE.

Government.—The supreme legislative power is vested in Parliament, which includes the House of Commons and the House of Lords. Parliament may be summoned by the writ of the sovereign and may be dissolved by his will. The House of Lords consists of peers who hold their seat either by hereditary right, by creation of the sovereign, by virtue of office, as bishops, by election for life, as in the case of Irish peers, by election for the duration of Parliament, as with the Scottish peers. The full House of Lords consists of about 700 members. The House of Commons consists of members representing county, borough, and university constituencies in the three Divisions of the United Kingdom. No one under 21 years of age can be a member of Parliament. Clergymen of the Church of England, ministers of the Church of Scotland, and Roman Catholic clergymen are disqualified from sitting as members. Under the Parliament Act of 1918, women are eligible to sit in the House, and the first woman took her seat in December, 1919. Members of the House of Commons are paid £400 per year. The total membership of the House of Commons is 707. The executive power of the government is vested nominally in the sovereign, but practically in the Cabinet, whose existence is dependent on the support of the majority in the House of Commons. Prior to December, 1916, the Cabinet consisted of the political chiefs of the principal government departments, and numbered about 20. With the formation of the Lloyd George Government, in 1916, the Cabinet was reduced to about six in number. This was known as the War Cabinet and was gradually expanded into an Imperial

War Cabinet by the inclusion of the Prime Ministers, and other representative ministers, of the various parts of the Empire. In July, 1918, the Prime Minister of each Dominion was given the right to nominate a Cabinet Minister either as a resident or a visitor in London, to represent him at the meetings of the Cabinet held between full meetings. In October, 1919, the War Cabinet was dissolved and a full Cabinet with about 20 members constituted. The head of the Ministry is the Prime Minister, and it is usually held in conjunction with some other high office of State, usually that of First Lord of the Treasury. The other members are appointed on the recommendation of the Prime Minister, and he dispenses the greater part of the patronage of the Crown.

History.—The history of the United Kingdom is practically identical with that of ENGLAND (*q. v.*). For the colonies of the United Kingdom, see BRITISH EMPIRE.

GREAT EASTERN, an English iron steamship, before the "Celtic" the largest vessel constructed, built (1854-1858) at Millwall, on the Thames, for the Eastern Steam Navigation Co., by Scott Russell, from plans by I. K. Brunel; length, 680 feet; breadth, 82½, or, including paddle-boxes, 118 feet; height, 58 feet (70 to top of bulwarks). She had 6 masts, 5 of iron and one of wood, and could spread 7,000 yards of sail, besides having 8 engines, divided between her screws and paddles, and capable of working at 11,000 horse power. From the first her career was unfortunate, the launching process alone lasting three months and costing $300,000. After several unremunerative trips to New York she was employed first as a troopship, and then as a cable-laying ship, for which her size and steadiness specially qualified her. Various attempts were afterward made to utilize her, but she at last came to be a mere holiday spectacle, and was broken up in 1888.

GREAT FALLS, a city of Montana, the county-seat of Cascade co. It is on the Chicago, Milwaukee and St. Paul, and the Great Northern railroads, and on the Missouri river. It is the center of an important mining region, and has extensive smelting works for the reduction of copper, gold, and silver ores. Lead, iron, zinc, and coal are also mined in the vicinity. The industries include the manufacture of flour, mining machinery, etc. It has an important trade in wool and is the center of an important agricultural region. The river here is spanned by two steel bridges, each over 1,000 feet long. The notable buildings include a public library, a city hall, and a hotel. There are seven parks. The neighboring country is of great scenic beauty. Water power is developed from Rainbow and Great Falls, which produces more than 200,000 horse power. Pop. (1910) 13,948; (1920) 24,121.

GREAT FISH RIVER. (1) In Cape Colony, a river rising in the Sneeuwberg Mountains, and, after a generally S. E. course of 230 miles, entering the Indian Ocean in latitude 33° 25′ S. and longitude 27° E. The Midland railway which connects Port Elizabeth and Port Alfred with Kimberley skirts part of the river; there is an iron bridge at Cradock, and Fish River Station is 207 miles from Port Elizabeth. (2) Great Fish river, or Back's river, in North America, enters an inlet of the Arctic Ocean in long. 95° W., after passing through Lake Pelly. Sir George Back traced its course to the ocean.

GREAT KANAWHA (ka-nâ′wä), an affluent of the Ohio river called New river in the upper part of its course, and rising in the Blue Ridge of North Carolina; it has a course of 450 miles, and is navigable to a fall 30 miles above Charleston, and about 100 miles from its mouth.

GREAT LAKES, the name given to that chain of lakes lying on the N. borders of the United States; they include Lakes Superior, Michigan, Huron, Erie, and Ontario.

GREAT SALT LAKE, in Utah, a sheet of water stretching along the W. base of the Wahsatch Mountains, about 4,200 feet above the sea, forming a principal drainage center of the Great Basin. The lake has well-marked shore lines on the mountains around, reaching 1,000 feet higher than the present level, show that the lake had formerly a vastly greater extent; this prehistoric sea has been named Lake Bonneville. Great Salt Lake is over 80 miles long and from 20 to 32 broad, but for the most part exceedingly shallow. It contains several islands, the largest, Antelope Island, about 18 miles long. Its tributaries are the Bear, Ogden, Jordan, and Weber, the Jordan bringing the fresh waters of Lake Utah; but Great Salt Lake has no outlet save evaporation, and its clear water consequently holds at all times a considerable quantity of saline matter in solution; in 1850 the proportion was 22.4 per cent., in 1869 it was only 14.8. Between these dates the annual tribute exceeded the evaporation, and the area of the lake increased from 1,700 to 2,360 square miles; more recently, it has again been

slowly receding. Several species of insects and a brine-shrimp have been found in its waters, but no fishes; large flocks of water-fowls frequent the shores. The first mention of Great Salt Lake was by the Franciscan friar Escalante in 1776, but it was first explored and described in 1843 by Frémont. A thorough survey was made in 1849-1850 by Capt. Howard Stansbury, U. S. A. See SALT LAKE CITY; UTAH.

GREAT SEAL, the official signature royal seal for the United Kingdom, held in charge by the Lord Chancellor for Crown Documents.

GREAT SLAVE LAKE a body of water in the Canadian Northwest Territory (62° N. lat.); greatest length about 300 miles, greatest breadth 50 miles. By the Slave river it receives the surplus waters of Lake Athabasca; and it discharges by the Mackenzie river into the Arctic Ocean. See ATHABASCA.

GREAT SLAVE RIVER, a river in Canada flowing from Alberta into the Northwest Territories, carrying the surplus waters of Athabaska Lake into Great Slave Lake. After leaving the former, it is joined by the Peace river, Its total length is about three hundred miles, practically all of which is navigable for river steamers during the open season. The valley through which it flows is remarkable for its fertility, but still largely unsettled.

GREAT SOUTH BAY, an arm of the Atlantic Ocean on the S. coast of Suffolk co., Long Island, N. Y.; 50 miles long, from 1½ to 5 miles wide. Great South Beach, which is about 35 miles long, and has Fire Island Lighthouse on the W. extremity, separates it from the ocean.

GRECO-TURKISH WAR, THE, a war which took place between Greece and Turkey in 1897. On Feb. 3, 1897, the Turkish troops in Crete wantonly pillaged and massacred a large number of Christians. About 15,000 Greek women and children fled to Greece, where the people had to provide for them. In the meantime the Cretans proclaimed their independence of Turkey, their union with Greece, and appealed to that country for help. This action led King George of Greece to send a small army to occupy the island, a movement which was opposed on the part of the Powers by whom the island was blockaded March 17, 1897. After a demand was made that the Greek troops be withdrawn from Crete, which was not complied with, the Powers landed soldiers and occupied the island. Soon afterward a body of Greek "irregulars" invaded Macedonia, whereupon the Turkish Cabinet declared on April 17 that a state of war existed with Greece, and Edham Pasha, commander of the Turkish army, was ordered to take the offensive.

This issue was promptly accepted by Greece, and hostilities were at once begun on the Grecian frontier, which soon developed into a general cannonading along the entire frontier of Thessaly, while operations were likewise initiated on the sea. The Greeks, fighting their way northward, invaded Turkey and threatened Alassona, while the Turks swept down from Salonika through the mountain passes and invaded Greece, thus forcing the Greeks to abandon Larissa, their principal source of supplies. In the meanwhile the Greek navy was active, having bombarded and destroyed a number of important towns along the Gulf of Salonika. During the latter part of April and the beginning of May the Greeks were mainly victorious. A Grecian army of 12,000, under General Smolenski, repulsed a Turkish force of 14,000, with heavy loss, near Velestino, on April 30, and held in check another movement May 2.

The tide, however, was soon turned, for on May 5 the Turks, with 50,000 men, compelled an army of 23,000 Greeks to withdraw from Pharsalos. The Greeks now became aware that they could not cope with the constantly increasing Turkish army, and this conviction, with the knowledge that the country was without funds, disheartened the soldiers and caused the army to collapse. On May 8 the Powers were informed that the Greek troops would be recalled from Crete, thus signifying that Greece was ready to be guided by the Powers.

On May 11 a joint note was sent to the Greek minister of foreign affairs offering mediation, and on May 12 a request for an armistice was sent to the Turkish Government. Four days later that country replied that it would not allow an armistice except on the following conditions: Annexation of Thessaly; an indemnity of £10,000,000; abolition of the capitulations or treaties conferring privileges on Greeks in the Turkish empire; and a treaty of extradition with Greece. These harsh terms met with a protest from all Europe. The Czar of Russia now wrote a personal letter to the Sultan, with the result that hostilities immediately ceased, and on May 20 an armistice for 17 days was concluded.

The question of the cession of Thessaly was referred to a military commission, which recommended no cession beyond the mountain summits on the Turkish frontier, which gave to Turkey a stra-

tegic boundary. Negotiations were finally concluded on Sept. 18, when a treaty was submitted to Turkey and Greece. The principal terms of this treaty were that Greece should pay Turkey about $15,000,000; permit a strategic reconstruction of the Thessalian frontier in Turkey's favor; and accept international control in financial matters. This treaty was signed at Constantinople, Dec. 4, 1897.

GREECE, a kingdom of southeastern Europe; bounded by Albania, Jugoslavia, Bulgaria, Turkey, the Black, Ægean, Ionian, and Mediterranean Seas; capital, Athens, with a population of about 300,000 (including Piræus). Greece gained greatly in territorial area as a result of the redistribution of territory at the Peace Conference in Paris. In addition to the acquisition of Thrace and numerous islands in the Ægean Sea, Greece also assumed the administration of the Smyrna district of Asia Minor, with a proviso that a plebiscite be held at the end of five years to determine whether or not it shall remain permanently in Greek hands. The acquisition of new territories obtained as a result of the war with Turkey, from October 17, 1912, to May 30, 1913, and with Bulgaria, from June 30 to August 10, 1913, gave the country a total area of 41,933 square miles. There were added as a result of the World War, Bulgarian or western Thrace, Macedonia, and the Ægean Islands, with the exception of Imbros, Tenedos and Castelorizzo, which according to the terms of the Peace Treaty are to be returned to Turkey. The population of the added territory is about 2,000,000 and of the old territory about 2,700,000; population of the kingdom about 4,821,300.

Topography.—Greece forms the S. extremity of the Balkan peninsula and numerous outlying islands. The coast line is very extensive, being formed by numerous gulfs and bays, of which the Corinthian and Saronic gulfs nearly meet at the Isthmus of Corinth, separating northern Greece from Morea. The surface is very mountainous. In the N. are the Cambunian Mountains, with Mount Olympus (9,754 feet) at the E. extremity. A range called Mount Pindus runs N. and S. parallel to both coasts, with many smaller ranges branching off in all directions. The rivers are small, and as a rule mere mountain torrents, none of them being navigable.

Production and Industry.—Greece is mainly an agricultural country, although only about one-fifth of the total area is suitable for cultivation. The deforestation of the country has gone on steadily for years, and this has greatly decreased the area that could profitably be devoted to agriculture. The land is to a large extent in the hands of peasant proprietors, and *metayer* farmers. Agriculture on the whole is in a backward state. The chief cereals grown are wheat, barley, rye, maize, and mezlin. The total area under cultivation in 1919 was 2,029,000 acres. The favorite crop is currant, the yield of which in 1919 was 145,000 tons. Olives are also of great importance. The production of olive oil in 1918 was 31,702,800 gallons, and the tobacco crop in the same year amounted to 48,699,000 pounds. In 1919 the tobacco crop was 57,198,455 pounds. The yield of wine in 1918 was 10,566,800 gallons, while the nut crop was about 5,000,000 pounds. The principal fruits grown are figs, oranges, mandarins, and lemons. Rice is cultivated in Macedonia. Cheese and other dairy products also form part of the agricultural industry.

There were in 1917 2,218 factories, employing 36,124 wage earners, with products valued at 260,363,647 drachmai. (A drachmai equals $0.193.) The production of cotton goods is the leading industry. There were in 1917 128,225 spindles and 16,965 looms.

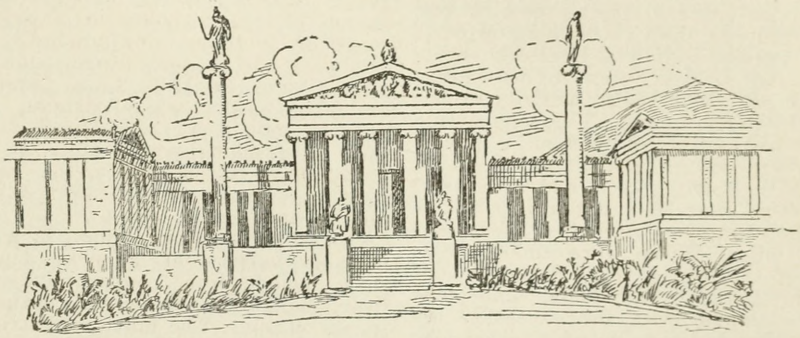
Mineral Production.—There is a considerable variety of mineral deposits which include iron, copper, zinc, lead, silver, manganese, aluminum, antimony, tin, nickel, etc. The laurium district of Thessaly and the Ægean Islands yield a large output of ores and earth. The chief mineral products in 1917 were as follows: iron, 63,364 tons; magnesite, 162,938 tons; salt, 45,560 tons; lead, 36,558 tons; zinc, 14,290 tons. The production of lignite coal in 1917 was 157,956 tons.

Commerce.—The total imports in 1917 were valued at $39,440,692, compared with a value in 1916 of $77,091,696. The chief articles of import are agricultural products, chemical products, cotton yarns and fabric, paper products and sugar. The exports in 1917 amounted to $21,191,911, compared with $32,852,564 in 1916. The chief exports are agricultural products, metals and minerals, oil and oil substances, and animal products. The chief trade was with the United Kingdom, France and Italy. The imports of Greece from the United States for the fiscal year 1920 were valued at $48,707,778, while the exports to the United States amounted to $1,953,756.

Communication.—There are in Greece about 1,400 miles of railway. Prior to the war with Turkey in 1912-13, Greece

was completely isolated by land from the rest of Europe, but in 1916 a railroad was completed between Gida on the Saloniki-Monastir line, and Papapuli on the Thessalian frontier, a distance of 56 miles, by which Greece was joined with the European railroads. In 1920 projects for new lines to the extent of 400 miles were under consideration. There are about 17,347 miles of telegraph wire and about 7,002 miles of telephone.

Finance.—The revenue in 1919 was £45,908,000, and the expenditure £61,656,000. The external debt of Greece in December 31, 1919, was £41,916,520. In 1918 the governments of Great Britain, United States, and France agreed to advance to Greece about £30,000,000, the control of which was lodged in a financial and military commission. Practically all this sum was loaned to Greece.



THE ACADEMY AT ATHENS

Education.—Education is compulsory for children between the ages of 6 and 12 years, but the law is not well enforced. The percentage of illiteracy is high. There are about 7,000 primary schools and about 9,000 teachers. For secondary education there are about 75 high schools and about 425 middle schools, with about 60,000 pupils. There are agricultural schools, trade schools, and commercial schools. The universities are those of Athens, the National University, and the Capodistria University. The annual appropriation for education is about 10,000,000 drachmai.

Government.—The government is a constitutional monarchy, the present constitution dating from 1864. The executive power is vested in the king and a ministry of 9 departments, Interior, Foreign Affairs, Communication, Education, Economy, Agriculture, Assistance, Finance, and Justice. The legislative authority is vested in a chamber, called the Boulé, consisting of 316 members, elected by universal suffrage for a term of four years, and in the Council of State. The Boulé meets annually for a term of not less than three nor more than six months.

History.—The Greek nation boasts of the highest antiquity, and in the early and mythic period of their history it is almost impossible to separate fable from fact. The Pelasgi were the first inhabitants, succeeded by the Hellenes. Having gained the advantage over the Pelasgi, and driven them to the islands, they peopled the continent with their own nation, who were divided into four tribes, viz., Æolians, Dorians, Ionians, and Achaians. The Hellenes spread in different directions over the country, and were soon joined by colonists from Egypt and Phœnicia. The first constitution of Greek cities is beyond the reach of exact history; but it seems that monarchy was the earliest form; and Sicyon is stated to have founded 2000 B. C. Athens, Thebes, Sparta, Corinth, and Argos. Of the mythic or heroic period, the principal events are the siege of Thebes, and the Trojan war, commencing 1198 B. C. The confusion arising from the latter event deprived many kingdoms of their princes, and encouraged the ambition of the Dorian heraclidæ to such an extent that they enslaved or expelled the inhabitants of the Peloponnesus. A fresh impulse was given thereby to emigration; large bodies of people crossed the Ægean, and colonized the shores of Asia Minor; and as the governments changed with the rulers, the states of Greece now began to partake of that republican form which was afterward their peculiar characteristic. The civil policy of Sparta and Athens, the growing power of which latter now began to lessen the influence of the other states, military knowledge, the arts of refinement and politics, advanced rapidly, and the quick

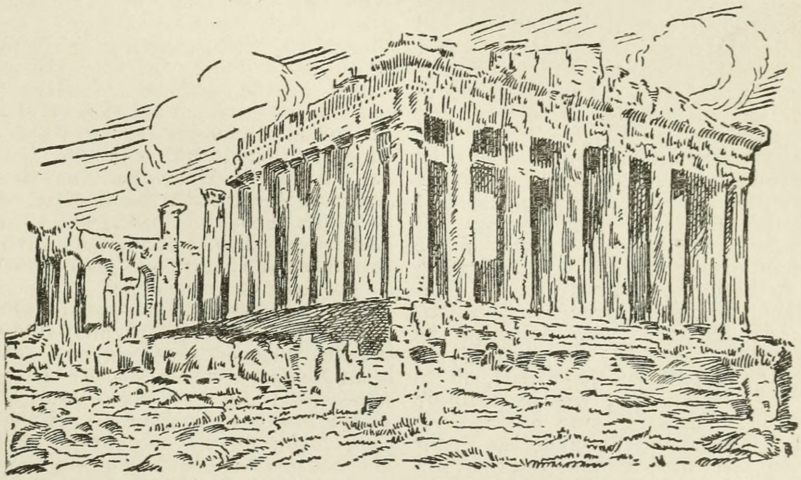
and sensitive Greeks carried refinement of manners to an extent not yet exceeded in modern times. They had at the same time an extensive commerce with Gaul, Italy, and Sicily. Their enterprise and love of liberty bore them successfully through all the troubles of the Persian war, 469 B. C.; but from the same reasons they became involved in intestine feuds. The Peloponnesian war, which lasted 30 years (ending 404 B. C.), destroyed their union, and paved the way for Philip of Macedon, who (338 B. C.) gained the decisive battle of Chæronæa, and thus became master of Greece. The brilliant conquests of Alexander engaged them for a few years; but their courage was now enervated, and their love of liberty almost extinguished. When the Achaian league proved a vain defense against the kingdom of Macedon, Greece was utterly unable to contend with the arms of Rome; and after a brief contest, ending with the battle of Corinth (146 B. C.), the entire country became an integral portion of the Roman empire.

From the Roman conquest in 146 B. C., Greece was held as a dependency of the BYZANTINES (*q. v.*), the Franks, and the Turks till 1821, when the war of independence began with a revolt in the Danubian provinces. In January, 1822, the first National Assembly met in Epidarus and framed a provisional constitution. In the same year occurred the massacre in Scio, by the Turks, reducing the population from 100,000 to 1,800. The Greek navy was exceedingly successful under the two daring Admirals Miaoulis and Canaris, the latter of whom set fire to the Turkish admiral's flagship in the midst of the night at Tjesme, opposite the island of Chios, and destroyed several other Turkish men-of-war. In 1823 the Greeks captured the Turkish camp at Carpenesion, but in 1826 the Turks captured Missolonghi, its starving garrison having cut its way through the Turkish camp, and besieged Athens, receiving its surrender in June, 1827. About this time England, France, and Russia decided to intervene and sent their fleets, composed of a dozen vessels of each nation, to the port of Navarino, in the W. part of the Morea, to enforce an armistice. The Turkish and Egyptian fleets, composed of about 120 men-of-war, were anchored in that port. The Turks having fired on a boat with a flag of truce, killing a British officer, Oct. 20, 1826, the allied fleet opened fire on the Turko-Egyptian fleet and destroyed it completely, with a fearful loss of life. After this the Sultan became more pliable, and negotiations began among the Great Powers about the final status of Greece, which resulted in the establishment of the Greek kingdom by the treaty of London in 1830.

At the close of the war Prince John of Saxony was offered the throne of Greece; on his refusal it was accepted conditionally by Leopold of Saxe-Coburg (later on King of the Belgians), who soon resigned because he insisted on more extended frontiers of the new kingdom. In 1833 Prince Otho, second son of King Ludwig, of Bavaria, was appointed king, and for 10 years the country was under Bavarian rule without a constitution. On Sept. 15, 1843, an insurrection of the garrison of Athens, under General Kallergis, forced the king to grant a constitution, and a National Assembly was convoked to frame one, which was finally adopted March 16, 1844, enacting the establishment of a House of Representatives, called Boulé, whose members were elected by universal suffrage, and a Senate, whose members were selected by the king for life. But this charter, snatched thus by force from the king, was not honestly carried out, and great dissatisfaction ensued. In 1862, while the king and queen were making a tour in the provinces, a rising took place at Athens, a provisional government composed of three members was elected, and the throne was declared vacant. The royal couple returned to Germany.

In December following, Prince Alfred, the second son of Queen Victoria, was elected king by universal suffrage. He was ineligible on account of being of the house of one of the protecting powers. In 1863 Prince George, second son of King Christian of Denmark, was appointed king by the protecting powers, and accepted by the people. He arrived in Greece in October, 1863. During his reign the development of Greece in every direction has been rapid. In 1897, owing to the massacres by the Turks in the island of Crete, the Greek Government announced its intention to intervene and landed surreptitiously a regiment of regulars. A war between Turkey and Greece followed, in which Greece was defeated in Thessaly, and for a whole year that province was occupied by the Turks, but was evacuated finally by the latter on a payment by Greece of a war indemnity of $19,000,000. Later Turkey was forced by the Great Powers to evacuate Crete, and Prince George of Greece was installed by them as high commissioner for governing the island. He resigned in 1906 as a result of internal

political disputes in the island and M. Zaimis, formerly Greek Premier, was appointed High Commissioner. Greece, in 1908, following the overthrow of Abdul Hamid, Sultan of Turkey, declared for union with Crete. This was not permitted, however, by the Great Powers. A political crisis was narrowly averted over the Cretan question in Greece, where the people disapproved of the failure of the government to insist on the inclusion of Crete into Greek territory. Following the Balkan War in 1912-1913, Crete was finally ceded to Greece. Greece came into political conflict with Bulgaria and Rumania over the question of Macedonia, and in 1905 diplomatic relations between Greece and Rumania were severed and were not resumed until 1912.



THE PARTHENON

Largely through the effective diplomacy of Venizelos, who for many years was practical political ruler of Greece, the Balkan League was formed in 1912 which successfully prosecuted war against Turkey. The Greek armies performed excellent service in the campaign of this war, especially in the capture of Saloniki. King George, while on a tour of inspection, was assassinated in Saloniki on March 18, 1913, and was succeeded by the Crown Prince Constantine. Greece received, as a result of this war, all of Thessaly, part of Epirus, and the most valuable portions of Macedonia and Thrace, including Saloniki. She received also Crete, as noted above. These additions to her territory nearly doubled the area and population of Greece.

The outbreak of the World War in 1914 placed the government of Greece in an especially difficult position. The treaty with Serbia obligated Greece to support the Serbians against any foreign aggression. It was known that Venizelos, the Prime Minister, was in favor of adhering to this treaty when Serbia was attacked by Austria. The King, however, had married a sister of the German Emperor, and his sympathies were strongly with Germany. The Greek Government, at the beginning of the war, assumed a neutral attitude. Bulgaria was negotiating with both sides and agreed to throw her fortunes with the Allies if the territory taken from her as a result of the Second Balkan War should be returned. Venizelos was willing to consider these territorial concessions. The pro-German elements in Greece, however, refused to consider such action. They were further strengthened by the entrance of Italy into the war on the side of the Entente. For the interests of Italy and Greece clashed in Albania and the islands of the Ægean, and the Greeks believed that some promises had been made to Italy which could be fulfilled only at the cost of Greek ambitions. In January, 1915, the islands of Tenedos and Lemnos were occupied as a base of operations against the Dardanelles. This was done with the consent of Venizelos. This brought the issue sharply to a point in Greece. The general staff declined to support Venizelos, and the King, through the Royal Council, refused to indorse Venizelos' action. He thereupon resigned and was succeeded by Gounaras, who was strongly pro-German. In June, 1915, Venizelos received a popular majority to the National Assembly of 120 seats, and in August the Guonaras

Cabinet resigned and the King was obliged to invite Venizelos back into power. In September the final invasion of Serbia by Austro-Hungarian, Bulgarian, and German armies began and the Allies wished to send aid through Saloniki. This was done with the consent of Venizelos, who was supported by the National Assembly. The King, however, declared that he could not support this pro-Ally policy and demanded Venizelos' resignation, which was given. He was succeeded by Zaimis and a policy of strict neutrality was again announced. Zaimis was also forced to resign in November as a result of a vote of lack of confidence in the government. The King appointed another of his supporters premier in the person of M. Skouloudis. He at once dissolved the National Assembly, announcing that a general election would be held to indicate the sentiment of the people of Greece. As the soldiers mobilized were not allowed to vote, it would have been impossible to ascertain the will of the people by this method. In the meantime, the Greek authorities, both civil and military, were hampering in every possible way the activities of the Allies, who were preparing to relieve Serbia from the South. On Nov. 19, 1915, French and British warships began a blockade of Greek ports with the object of bringing Greece to terms through economic pressure. The strict embargo established quickly brought the Greek people to the verge of starvation and raised the danger of popular revolution in Athens. Finally the King and the government surrendered, and the Greek army, which had been concentrated around Saloniki, was withdrawn, and the railroad running from Saloniki to the Macedonian front was turned over to the Allied authorities. The sympathy of the Greek Government, however, continued to be strictly pro-German, and Venizelos was again in retirement. A general election was held, but the supporters of Venizelos refused to vote. The Bulgarian army on May 26, 1916, crossed the Grecian frontier. The Greek forces offered no resistance and either surrendered to the Bulgarians or retired. It was the belief among the Allied governments that this was the result of a secret agreement between the Greek Premier and Germany. In June, another partial blockade of Greek ports was instituted. This resulted in the partial demobilization of the Greek army. Finally, on June 23, 1916, the Allies demanded complete demobilization, a new cabinet, and the dissolution of the National Assembly. The cabinet resigned and Alexander Zaimis became Prime Minister. The conditions exacted by the Allies were not fully kept. Among the people, Allied sentiment continued to grow, but the government remained firm in its pro-German policy. On Oct. 11, 1916, the Allied warships suddenly seized the larger part of the Greek fleet. This was followed by an attack, on Dec. 2, by Greek soldiers upon French marines stationed at Athens. Venizelos now declared himself in revolt against the King and established himself in Saloniki. The situation remained estranged until during the spring of 1917, on June 12, it was suddenly announced that Constantine had abdicated in favor of his second son, Alexander. This was the result of an ultimatum presented by the Entente nations. On the following day Constantine embarked on a British warship to Italy, going thence to Switzerland, where he remained in retirement until December, 1920. He was accompanied by members of his family.

The hostile attitude of Greece now came to an end. Venizelos returned to Athens and was invited by King Alexander to form a new cabinet. On June 29 the Greek Government severed diplomatic relations with the Central nations and prepared to take part in active hostilities. The Greek army rendered valuable service in the operations which followed in the Balkans.

In the person of Venizelos, Greece was one of the most active participants at the Peace Conference, and as a result of his policy Greece was awarded large concessions in Macedonia and Thrace. These are described in an earlier portion of this article. A great peace celebration was held in Athens following the deliberations of the Peace Conference, but propaganda to restore Constantine to the throne was already under way. On Aug. 12 an attempt was made to assassinate Venizelos in Paris. On Oct. 25 King Alexander died as the result of a bite from a pet monkey. Three days later Parliament proclaimed as King his brother Paul, who was at that time with his father at Lucerne. Paul declined the throne, thereby strengthening the conspiracy to bring back the deposed sovereign. An election was held on Nov. 14 and a special plebiscite on Dec. 5, both of which were strongly in favor of the return of Constantine. Despite the protest of the Allies, he returned and was received triumphantly as King. Greece ratified the Bulgarian, Austrian, and German treaties on Feb. 28, 1920. Turkey refused to abide by the conditions of the Sèvres Treaty, by which Greece was awarded portions of former Turkish

territory in Asia Minor. The so-called Turkish Nationalists, under the command of Mustapha Pasha, began a campaign in Asia Minor, and the Greek Government undertook to suppress this. Operations were carried on throughout the latter part of 1920 and in 1921, with little definite results. The Allied Supreme Council met in London in March, 1921, and endeavored to compromise the difficulties between Turkey and Greece.

GREEK CHURCH, the Eastern Church, that of the old Eastern Empire, which, prior to the Turkish conquest, had its metropolis at Constantinople, as distinguished from the Western Church, which had its capital at Rome; the church of the people speaking the Greek language rather than that of the Roman nation.

History.—That the Eastern and Western Churches would first disagree, and then separate, was insured from the first by the difference in their mental constitution. The Greeks were notable for intense intellectual acuteness, which they used to frame hair-splitting subtleties of doctrine. The Romans, on the contrary, who had the imperial instinct employed the new faith as a means of building up again a world-embracing dominion, with the "eternal city" as its capital. The first variance between the East and the West arose in the 2d century regarding the time of keeping Easter. The disputes which succeeded were chiefly as to personal dignity. As long as Rome was the metropolis of the empire, the Bishop of Rome had indisputably the most important see in the Church; but when, on May 11, 330, Constantine removed the seat of government to Byzantium (Constantinople), the bishop of the new metropolis became a formidable rival to his ecclesiastical brother at Rome. In the second General Council, that of Constantinople, 381, the Bishop of Constantinople was allowed to sit next to the Bishop of Rome; by the 28th canon of the Synod of Chalcedon, 403, he was permitted to enjoy an equal rank. In 588, John, Patriarch of Constantinople, assumed the title of œcumenical or universal bishop, for which he was denounced by Pope Gregory the Great. Disputes in the 8th century about image-worship widened the breach, as did the continued rejection by the Greek Church of the word Filioque, asserting the procession of the Holy Ghost from the Son as well as from the Father, introduced by the second Council of Constantinople, 381. The last General Council in which the Churches of the East and the West were united was the Seventh, or Second Council of Nice, 787. The feud continued through the 9th and on to the 11th century. In the 13th an effort was made by Michael Palæologus to promote a reunion of the two great Churches at the Council of Florence, but all was in vain. They have remained separate till now. Efforts are said to be on foot looking to the union of the Greek and Roman Churches.

GREELEY, a city of Colorado, the county-seat of Weld co. It is on the Union Pacific, the Denver, Laramie and Northwestern, and the Colorado and Southern railroads, and on the Cache la Poudre river. It is the center of an important agricultural and cattle region. It has a large trade in potatoes, flour, wheat, etc. Its industries include lumber yards, flour mills, and a beet-sugar factory. The city is the seat of the State Teachers' College, and has a public library and two parks. It was the site of the "Greeley Colony," named after Horace Greeley, which was the first agricultural community in Colorado. Pop. (1910) 8,179; (1920) 10,883.

GREELEY, HORACE, an American journalist; born in Amherst, N. H., Feb. 3, 1811. About 1825, his parents having removed to Vermont, Horace obtained employment as an apprentice in a printing office, and in August, 1831, arrived at New York, where he secured occasional work as a journeyman printer in various offices. In 1834, in partnership with Messrs. Winchester and Gibbett, he started "The New Yorker," a weekly literary journal, which proving unprofitable, was abandoned, and in 1841 he commenced the publication of the New York "Tribune." In 1848 he became a member of the 30th Congress; in 1851 he



HORACE GREELEY

visited Europe, and was chosen chairman of one of the juries of the Great Exhibition in London. He wrote: "Hints Toward Reforms," "History of the Struggle for Slavery Extension" (1856); "The American Conflict" (1864-1866); "Recollections of a Busy Life" (1868). He ardently supported the Union cause during the Civil War. In 1872 he was nominated by the Democratic party a candidate for the presidency in opposition to General Grant, but he failed to be elected. He died in Pleasantville, Westchester co., N. Y., Nov. 29, 1872.

GREELY, ADOLPHUS WASHINGTON, an American Arctic explorer; born in Newburyport, Mass., March 27, 1844. He served as a volunteer through the war of 1861-1865, and shortly after its conclusion entered the regular army as lieutenant, and in 1868 was placed on the signal service. In 1881 he was selected to conduct the American expedition to the head of Smith Sound, for the purpose of carrying on observations in pursuance of the international scheme arranged at Hamburg in 1879. He and the survivors of his party were rescued in June, 1883, when at the point of perishing from starvation, after spending three winters in the Arctic regions. Lieutenant Lockwood of this expedition traveled to within 396 miles of the geographical pole, the farthest point N. hitherto reached. In 1887 Greely was appointed chief of the signal service, with the rank of a Brigadier-General. In 1906 he was promoted Major-General for completing the Ute campaign. He accomplished a great relief work when 400,000 people in San Francisco were made homeless by the earthquakes. He retired in 1908. He published "Three Years of Arctic Service" (1886). He died in 1920.

GREEN, ANNA KATHARINE, the maiden name and pseudonym of MRS. ROHLFS, an American author; born in Brooklyn, N. Y., Nov. 11, 1846. She graduated at Ripley (female) College, Poultney, Vt., 1867. Her novels are detective stories, and enjoy great popularity. "The Leavenworth Case" (1878) is one of her best. Included in her publications are: "Risifi's Daughter" (1866), a dramatic poem; "The Sword of Damocles"; "A Strange Disappearance"; "Hand and Ring"; "The Mill Mystery"; "That Affair Next Door"; "Lost Man's Lane" (1898); "Agatha Webb" (1899); "The Circular Study" (1900); "Dark Hollow" (1914); "Mystery of the Hasty Arrow" (1917), etc.

GREEN, JOHN RICHARD, an English historian; born in Oxford, England, in December, 1837. He was educated at Magdalen College School and at Jesus College, Oxford. He took orders, and was in succession curate and vicar of two East End London parishes. In 1868 he became librarian at Lambeth, and next year he was struck down with consumption, a disease which made any kind of active work thereafter impossible. He published his "Short History of the English People" in 1874. It was the first complete history of England from the social side. The work attained an unparalleled success, as many as 150,000 copies having been sold within 15 years. He wrote also a larger and independent edition of the work as "A History of the English People" (4 vols. 1877-1880); "Stray Studies from England and Italy" (1876); "Short Geography of the British Islands" (1879), written in conjunction with his wife; "Making of England" (1882); "The Conquest of England" (1883). In 1879 he received the degree of LL. D. from the University of Edinburgh. He died in Mentone, France, March 7, 1883.

GREEN, THOMAS HILL, an English philosopher; born in Birkin, Yorkshire, England, April 7, 1836. He was educated at Rugby, and Balliol College, Oxford, taking there in 1859 a first-class in *litteræ humaniores*, later a third in law and modern history, and in November, 1860, being elected to a fellowship in his college, to which he was re-elected in 1872, becoming also its first lay tutor in 1866. He married a sister of John Addington Symonds in 1871, and was appointed in 1877 to be Whyte's Professor of Moral Philosophy. He wrote "Prolegomena to Ethics"; "Works" (3 vols. 1885-1888); etc. He died March 26, 1882, leaving £1,000 to the university for a prize essay in the department of moral philosophy, £1,000 to found a scholarship at the Oxford High School for boys, and £3,500 to Balliol College for the promotion of higher education in large towns. He died in 1882.

GREENAWAY, KATE, an English artist; especially famous for her pictures of child life. Her first book was "Under the Window," followed by illustrations for "Pied Piper of Hamelin," "Marigold Garden," "Mother Goose," etc., and two books of her own, "A Painting Book for Boys and Girls," and "Kate Greenaway's Alphabet." She died in London, Nov. 8, 1901.

GREENBACK PARTY, in the United States, called by its members the Independent National party, was organized in 1876, and was the outgrowth of the Granger and Labor Reform movements. Its convention at Indianapolis in May, 1876, demanded "the unconditional repeal

of the Specie Resumption Act on Jan. 14, 1875"; urged the issue of United States notes as a circulating medium, and the suppression of bank paper; and protested against the further issue of gold bonds, and the purchase of silver to replace the fractional currency. Peter Cooper was nominated for President, and received 81,740 votes. In 1880 its candidate was James B. Weaver, who received 306,305 ballots. It has never gained any electoral votes. In 1884 the party indorsed the nomination of Benjamin F. Butler by the People's party, which polled 175,370 votes.

GREEN BAY, a city and county-seat of Brown co., Wis.; on Green bay, the Fox river, and the Chicago and Northwestern, the Chicago, Milwaukee and St. Paul, the Green Bay and Western, and the Kewaunee, Green Bay and Western railroads; 65 miles N. N. E. of Fond du Lac. It is at the head of lake and the foot of river navigation; has an ample harbor, and carries on a large trade in lumber, coal, grain, flour, cheese, etc. It has waterworks, electric lights and street railroads. National banks, public library, high school, several Roman Catholic and Lutheran parochial schools. The United States Government constructed a ship canal to connect the Mississippi river with Lake Michigan, using the Wisconsin and Fox rivers, the cost of which was over $10,000,000. Pop. (1910) 25,236; (1920) 31,017.

GREENE, FRANCIS VINTON, an American military officer; born in Providence, R. I., June 27, 1850. He graduated from West Point in 1870, and served till 1886, when he resigned with the rank of captain. He was assistant astronomer on the Northwest Boundary Survey from 1872 to 1876, and was attached to the headquarters of the Russian army during the Russo-Turkish War of 1877-1878. In the American-Spanish War (1898), he was commissioned a Major-General of volunteers and served principally in the Philippines. His chief works are: "The Russian Army and its Campaigns in Turkey" (1879); "Army Life in Russia" (1880); "The Mississippi" (1882); "Life of Nathanael Greene" (1893), and a detailed report on the Philippine Islands (1889). He was Police Commissioner in New York City in 1902. Author of "The Revolutionary War and Military Policy of the U. S." (1911), etc.

GREENE, NATHANAEL, an American military officer; born in Warwick co., R. I., May 27, 1742. His school education was of the simplest and most limited character; but by industry he acquired a knowledge of the principal branches of English education, and made some progress in law. On the commencement of the troubles between the colonies and Great Britain, he volunteered as a private (1774); but the following year he was chosen, by the Assembly of Rhode Island, general of the contingent furnished by that colony to the army near Boston. He was made Major-General in the Continental army in 1776, and accompanied Washington on his brilliant expedition into New Jersey near the close of the same year. He performed a prominent part in the disastrous battle of Germantown (1777), on which occasion his courage and skill did much toward retrieving the reputation of the American arms. In 1778 he was appointed quartermaster-general. After the defeat of General Gates (1780) at the battle of Camden, S. C., he was appointed to the command of the S. army, which he found demoralized, and in a state of utter destitution. His presence soon restored the confidence of the troops. In March, 1781, he was defeated by Lord Cornwallis in the hard-fought battle of Guilford Court House, but the English general derived no permanent advantages from this success. Cornwallis having retreated into Virginia, Greene defeated, after a severe action (September, 1781), the forces of Colonel Stewart at Eutaw Springs, and thereby put an end to the British power in South Carolina. This was the last battle in which General Greene was engaged, though he held his command till the end of the war. He died from the effect of a sunstroke at Mulberry Grove on the Savannah river, June 19, 1786.

GREENE, ROBERT, an English poet and dramatist; born in Norwich, England, in 1560. He took his degree of A. B. at Cambridge University in 1578. He afterward traveled in Spain and Italy. On his return he re-entered the University, and took his degree of A. M. in 1583. On leaving Cambridge he proceeded to London, where he supported himself by writing plays and romances. One of the latter, "Pandosto: The Triumph of Time,'" supplied Shakespeare with hints for the plot of "The Winter's Tale." The most popular of his plays was "Friar Bacon and Friar Bungay." His literary fame rests on the poetry which he scattered through his romances—some of his pastoral songs being unsurpassed for tenderness and natural grace. He died in London, Sept. 3, 1592. After his death appeared the singular pamphlet entitled "The Repentance of Robert Greene, Master of Arts," in which he lays bare the wickedness of his former life.

GREENFIELD, a town and county-seat of Franklin co., Mass.; on the Boston and Maine railroad; 56 miles W. of Fitchburg. It contains Factory and North Parish villages; manufactures principally shoes, cutlery, silverware, machinists' tools, snow shovels, cement blocks, paper boxes, rakes, and baby carriages; and has electric lights, waterworks, public library, high school, a National bank, the county hospital and weekly newspapers. Pop. (1910) 10,427; (1920) 15,462.

GREENLAND, an island situated in the N. E. of North America, from which it is separated by Davis Straits, Baffin Bay and Smith Sound; area about 849,000 square miles. A part of the island belongs to Denmark; its area is 46,740 square miles. A greater part of coast is yet unknown; but it does not extend farther than about lat. 83°. Like the N. parts of North America generally, Greenland is colder than the corresponding latitudes on the E. side of the Atlantic. In June and July the sun is constantly above the horizon, the ice on the coast is broken up and floats S. and a few small lakes are opened; but the short summer is followed by a long and dreary winter. The interior, which is lofty, is uninhabitable, and all the villages are confined to the coasts, which are lined with numerous islands, and deeply penetrated by fiords. The Danish colony extends N. on the W. coast, to the Bay of Disco, in lat. 69°. N. Cultivation is confined to the low shores and valleys, where grassy meadows sometimes occur with stunted shrubs and dwarfed birch, alder, and pine trees. Attempts to raise oats and barley have failed, but potatoes have been grown toward the S. extremity. Turnips attain the size of a pigeon's egg, and cabbages grow very small. The radish is the only vegetable which grows unchecked.

The inhabitants are largely dependent on hunting and fishing. Whale blubber and seal oil are used as fuel. The land animals are the Esquimaux dog, the reindeer, the polar bear, the Arctic fox (blue and white), the ermine, the Arctic hare, and the musk ox. Among the amphibia the walrus and several species of seal are common. The seas abound in fish, the whale and cod fisheries being of special importance. Seafowl are abundant in summer, and largely killed. The chief mineral product is cryolite, but graphite and miocene lignite coal are also found. Oil, eider down, furs, and cryolite are exported. For administrative purposes Greenland, or rather its coast, is divided into two inspectorates of North and South Greenland. The residences of the inspectors are at Disco Island and Godhaab, but the most populous district is Julianshaab.

Greenland was discovered by an Icelander named Gunnbjörn about 876 or 877, and was colonized from Iceland about the end of the 10th century. In the reign of Elizabeth, Frobisher and Davis rediscovered the coast, but nothing was done to explore it till the Danish Government in 1721 assisted Hans Egede, a clergyman, to establish a European mission settlement, Good Hope (Godhaab), which was successfully carried on by him and his son. Whale fisheries were established on the coast by the English and Dutch about 1590. The interior of the country was first crossed from E. to W. by Nansen in 1888. Pop. about 14,000.

GREENLET, in ornithology, *Vireoninæ*, a sub-family of *Muscicapidæ* (fly-catchers). They are so called from having much green or olive in the colors of their plumage. They are small birds arriving in the United States from South America and the West Indies about the month of May, and departing again in August. Some of them sing sweetly.

GREEN MOUNTAIN BOYS, a name applied to the male inhabitants of Vermont, from the chief range of mountains in the State, and used especially in referring to regiments from Vermont in the Revolution and the Civil War.

GREEN MOUNTAINS, a considerable mountain range commencing in Hartford co., Conn., and extending N. through Massachusetts and Vermont into Lower Canada. Length, about 240 miles. Their greatest elevation is in Vermont, where Mount Mansfield, or North Peak, rises to a height of 4,389 feet. Their geological formation is the metamorphic slates, gneiss, quartz rock, limestone, etc., of the Laurentian epoch, the general range of which is about N. 15° E., with a prevailing dip of 30° to 55°. The slopes are covered on the disappearance of the snow in spring with fine pastures of rich green grass, which may have given to the mountains their name, though this is commonly referred to the growth of evergreen forest trees.

GREENOCK, a seaport of Renfrewshire, the fifth largest town in Scotland, on the S. shore of the Firth of Clyde, 3¾ miles by water S. of Helensburgh, and 22½ by rail W. N. W. of Glasgow. The W. end of the town, with its elegant villas of every style of architecture, its esplanade 1½ miles long, its wide and well-paved streets, planted with trees, is attractive. The public buildings are many of them handsome; chief among

them is the town hall and municipal buildings (1886), Renaissance in style, with a tower 245 feet high; the county buildings (1867), the custom house (1818), and the Watt Institution (1837), containing a marble statue of Watt by Chantrey. There are several handsome churches. To Sir Michael Shaw-Stewart the town is indebted for the Well Park (1851), the Wellington Park (1872), and the Lyle Road (1880). The new cemetery, 90 acres in extent, with its Watt cairn, and fine waterworks (1827-1883) also deserve mention. The harbor works date from 1707. The annual trade exceeds $15,000,000. Shipbuilding has been carried on since 1760; sugar refining began in 1765, and there are also manufactures of steam engines, anchors and chain cables, ropes, sailcloth, paper, wool and worsted, etc. Besides being the birthplace of Watt, of Spence the mathematician, and of Principal Caird, it has memories of Rob Roy, John Wilson, and Galt, and contains the grave of Burns' "Highland Mary." Pop. about 70,000.

GREENOUGH, HORATIO, an American sculptor; born in Boston, Mass., Sept. 6, 1805. He studied for two years at Harvard, and from 1825 spent the greater part of his life in Italy. His principal work was the colossal statue of Washington, in front of the National Capitol. Other important sculptures are his "Medora," "Venus Victrix," and a group of four figures, "The Rescue," for the purpose of placing which he returned to the United States in 1851. He died in Somerville, Mass., Dec. 18, 1852.

GREEN RIVER (1) Rises in western Wyoming, flows S. E. into Colorado, and then S. W. and S. through Utah, joining the Grand river, a branch of the Colorado, after a course of 750 miles. (2) Green river, Kentucky, rises near the center of the State, flows W. and N. W., passing near the Mammoth Cave, and crosses the N. boundary, entering the Ohio 9 miles above Evansville, Ind. It is about 350 miles in length; and is navigable for small steamers for 150 miles; its lower course is through the coal-fields of western Kentucky. At Tebb's Bend, on this river, a smart action of several hours took place, July 4, 1863, between a body of Confederate raiders under Morgan, the famous cavalry leader, and about 200 Michigan troops under Colonel Moore, in which the former were repulsed with a loss of more than 200 killed and wounded. Moore, being intrenched, lost only 6 killed and 23 wounded.

GREENSBORO, a city of North Carolina, the county-seat of Guilford co. It is on the Southern railroad. It has an important trade in tobacco, cotton, coal, and iron. Its industries include cotton-mill supplies, cotton goods, saw-mill machinery, furniture, fertilizers, etc. It is the seat of the Greensboro Female College, the State Normal and Industrial College for white women, the State Agricultural and Mechanical College for colored students, and the Bennett and Lutheran colleges for negroes. Its public buildings include a Masonic Home, a public library, several hospitals, and 2 parks. Pop. (1910) 15,895; (1920) 19,861.

GREENSBURG, a city of Indiana, the county-seat of Decatur co. It is on the Cleveland, Cincinnati, Chicago, and St. Louis railroad. The city is the center of an important agricultural and natural gas region. In the neighborhood are important limestone quarries. Its industries include flour mills and a wire factory. It is the seat of the State Odd Fellows' Home, and has a park and a public library. Pop. (1910) 5,420; (1920) 5,345.

GREENSBURG, a town and county-seat of Westmoreland co., Pa.; on the Pennsylvania railroad; 31 miles E. S. E. of Pittsburgh. It is in a coal-mining, coking and natural gas region; and contains a steam-heating apparatus factory, steel works, glass works, nut and bolt works, and has 3 National banks. Pop. (1910) 13,012; (1920) 15,033.

GREEN SEA, the Persian Gulf, so named from a remarkable strip of water of a bright green color along the coast of Arabia.

GREENVILLE, a city of Mississippi, the county-seat of Washington co. It is on the Yazoo and Mississippi Valley, and the Southern in Mississippi railroads. The city has river connection with various ports. It has a large trade in cotton. Its industries include cotton-seed oil mills, cotton compresses, and lumber mills. Its public institutions include parks and playgrounds, a public library, and the King's Daughters' Home. Pop. (1910) 9,610; (1920) 11,560.

GREENVILLE, a city of North Carolina, the county-seat of Pitt co. It is on the Tar river, and on the Norfolk Southern and the Atlantic Coast railroads. It is the center of an important tobacco, cotton, and corn-growing district, and its industries include tobacco factories, cotton mills, and cottonseed-oil mills. It is the seat of the East Carolina Teachers' Training School. Pop. (1910) 4,101; (1920) 5,772.

GREENVILLE, a city and county-seat of Darke co., O., on Greenville creek, and the Cincinnati Northern, Day-

ton and Union, and the Pittsburgh, Cincinnati, Chicago and St. Louis railroads; 35 miles N. of Dayton. It is noted as the site of Anthony Wayne's treaty with the Indians. There are waterworks, electric lights, grain elevators, 3 National banks, a public library, daily and weekly newspapers. Pop. (1910) 6,237; (1920) 7,104.

GREENVILLE, a borough of Pennsylvania, in Mercer co. It is on the Shenango river and on the Pennsylvania, the Erie, and the Bessemer and Lake Erie railroads. Its industries include railroad shops, bridge works, gristmills, automobile factories, foundry and machine shops, steel works, etc. It is the seat of Thiel College. Pop. (1910) 5,909; (1920) 8,101.

GREENVILLE, a city and county-seat of Greenville co., S. C.; on the Southern and the Charleston and West Carolina railroads; 153 miles N. W. of Columbia. It is the seat of Furman University, Greenville College for Women, Chicora College, Greenville Female College, a military institute, and a business college. Its industries include the manufacture of cotton, wagons, underwear, etc. It has waterworks, electric lights, several newspapers, and 2 National banks. Pop. (1910) 15,741; (1920) 23,127.

GREENVILLE, a city of Texas, the county-seat of Hunt co. It is on the Missouri, Kansas and Texas, the Texas Midland, and the St. Louis Southwestern railroads. It is the center of an important agricultural region. Its industries include cottonseed-oil mills, cotton compresses, etc. It is the seat of Burleson College, Wesley College, and Holiness University. Pop. (1910) 8,850; (1920) 12,384.

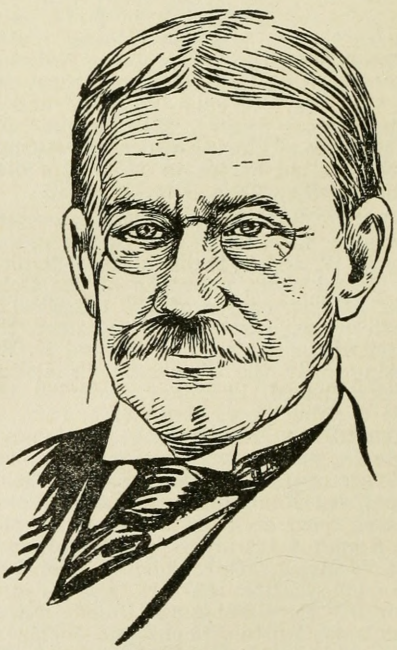
GREENWICH (grin'ij), a borough of the city of London, England, on the right bank of the Thames, 6 miles S. E. of London bridge. It contains a magnificent hospital for invalid seamen, built by Sir Christopher Wren (1696). The Royal Observatory, erected by Charles II., is under the charge of the Astronomer Royal, a position that has been filled by Flamsted, Halley, Bradley, Bliss, Maskelyne, Pond, Airy, etc. The longitude of all English charts and maps is reckoned from this observatory, and the captains of ships take their time, as given at 1 P. M. Pop. of borough about 96,000.

GREENWICH, a borough of Connecticut, in a town of the same name, in Fairfield co. It is entirely a residential place and contains many beautiful private residences. Pop. borough, (1910) 3,886; (1920) 5,939. Pop. town, (1910) 16,463; (1920) 22,123.

GREENWOOD, a city of Mississippi, the county-seat of Leflore co. It is on the Southern and the Yazoo and Mississippi Valley railroads. The city is the center of an important cotton-growing district and its industries include the manufacture of oil, cotton compresses, furniture, wagons, ice, lumber, etc. The notable buildings include a Carnegie library, Elks' Home, a court house, and school buildings. Pop. (1910) 5,836; (1920) 7,793.

GREENWOOD, a city of South Carolina, the county-seat of Greenwood co. It is on the Seaboard Air Line, the Piedmont and Northern, the Southern, and the Charleston and West Carolina railroads. Its industries include the manufacture of lumber, cottonseed-oil, cotton, spools, bobbins, etc. The city is the seat of the Brewer Normal School for negroes, the Lander Female College, and the Bailey Military Institute. Pop. (1910) 6,614; (1920) 8,703.

GREER, DAVID HUMMELL, an American Protestant Episcopal bishop, born at Wheeling, W. Va., in 1844. He



BISHOP GREER

graduated from Washington College in 1862 and studied theology at the Protestant Episcopal Seminary at Gambier, O. He was ordained priest in 1868, and was

rector of churches in Kentucky and Rhode Island. In 1888 he was appointed rector of St. Bartholomew's Church in New York and served until 1904. He was elected Bishop Coadjutor for New York in 1903; and in 1908, following the death of Bishop Potter, he was made Bishop of New York. He died in 1919. He wrote "Moral Power of History" (1890); "The Preacher and His Place" (1895); "Visions" (1898).

GREGORIAN CHANT, or **TONES** (Latin *cantus Gregorianus*), the name given to certain choral melodies introduced into the service of the early Christian Church by Pope Gregory the Great, and still forming the basis of cathedral music. By the Gregorian tones, or modes (*toni, modi*) of Gregory, must be understood a certain melodious formula, made out of the union of a perfect fifth and a perfect fourth, or their inversion, to give the Church song greater variety. All the old writers agree as to the diatonic genus of the Gregorian tones, but they do not all agree as to the number of the tones: some counting 14, others 12, while in some old Roman choral books there are only 11.

GREGOROVIUS, FERDINAND (greg-ō-rō'vē-ös), a German historian and poet; born in Neidenburg, East Prussia, Jan. 19, 1821. He studied at Königsberg and at home, and wrote essays of deep scholarship; "Socialistic Elements in Goethe's Wilhelm Meister"; a tragedy, "The Death of Tiberius"; "Corsica"; books of travel and description, based on close personal study; also "Euphorion," an epic, and other poems of high repute. But his historical works, of unsurpassed learning and vivid realization of the spirit of their time, are the most commanding monument of his genius. "The City of Rome in the Middle Ages," "Lucretia Borgia," "Urban VIII.," "The Monuments of the Popes," and "Athenais," need but be named. He died in Munich, May 1, 1891.

GREGORY, the name of a number of popes.

GREGORY I., surnamed the Great, a Pope; born in Rome, about 544. He showed such abilities as a senator that the Emperor Justinus appointed him prefect of Rome, after which he embraced the monastic life in a society founded by himself. Pope Pelagius II. sent him as nuncio to Constantinople, and on his return made him apostolical secretary. He was elected successor to that pontiff in 590. Pope Gregory was pious and charitable, had lofty notions of the papal authority, was a reformer of the clerical discipline, and after his death was canonized. His works are comprised in four volumes. He died in 604.

GREGORY II., St., succeeded Constantine in the pontificate in 715, and died in 731.

GREGORY III., a native of Syria, succeeded Gregory II. He sent legates to Charles Martel to demand succor against the Lombards, which embassy is considered to be the origin of the apostolical nuncios in France. Died in 741.

GREGORY IV., a Roman, succeeded Valentine in 828, and was greatly esteemed for his learning and piety. Died in 844.

GREGORY V., a German, and a kinsman of the Emperor Otho, succeeded John XV., in 996. An anti-pope, named John XVI., was set up against him by Crescentius, a consul of Rome, but was expelled by the emperor. Died in 999.

GREGORY VI., a Roman, succeeded John XIX., who finding the lands and revenues of his church greatly diminished by usurpations, and the roads infested by robbers, acted with such vigor that a powerful party was raised against him by those who had been accustomed to live by plunder. At a council held at Sutri in 1046 Gregory abdicated the pontificate. Died in Cologne, about 1048.

GREGORY VII., HILDEBRAND, son of a carpenter; born in Soano, Tuscany, about 1020. He was the friend and counsellor of Leo IX. and the four succeeding Popes, and on the death of Alexander II. was elected to succeed him in 1073. He obtained confirmation in his election from the Emperor Henry IV., and immediately applied himself zealously to reform simony and the licentiousness of the clergy. In his view, however, marriage, no less than concubinage, was a sin in them. He menaced the emperor and the King of France, the latter without effect. In 1074 he assembled a council, by which it was forbidden the prelates to receive investiture of a layman; and this was the first step in the quarrel with the emperor, which lasted so many years. Henry, disregarding the papal authority, was summoned to Rome; but he held a diet at Worms, and pronounced the deposition of the Pope. To this Gregory replied by procuring the deposition of the emperor and the election of another, Rudolph of Suabia. Henry now promised submission; and in the early winter of 1077 went with his wife and child to Italy. The Pope was at the castle of Canossa, and there, after keeping the penitent Emperor of Germany three days waiting at the gate, he received him and gave him absolution. The terms imposed on him were intolerable, and he soon broke them, made war on Rudolph, and defeated him, set up a rival Pope in

Guibert, Archbishop of Ravenna, with the title of Clement III., and after several unsuccessful attempts entered Rome in 1084, had himself crowned emperor by his own Pope, and besieged Gregory in San Angelo. The Pope was delivered by Guiscard, and retiring to Salerno, died there May 25, 1085.

GREGORY VIII., born in Benevento, succeeded Urban III., 1187, and died the same year, after having exhorted the Christian princes to undertake a new crusade.

GREGORY IX., UGOLINO, Count of Segni, a native of Campania, and a near relative of Innocent III.; born about 1147. He became bishop of Ostia, and cardinal, and in 1227 succeeded Honorius III. His coronation surpassed in magnificence any which had preceded it, and the ceremony lasted three days. The principal events of his pontificate were the various incidents of his contest with the great Emperor Frederick II., whom he repeatedly excommunicated, absolving his subjects from their allegiance, and proclaiming a crusade against him. In 1229 Gregory levied a tithe on all movables in England toward the expenses of his war with Frederick. He established, a few years later, the inquisition at Toulouse and Carcassonne, excited by his haughty demeanor a revolt at Rome in 1234, and was driven from the city, to which he did not return for three years. St. Anthony of Padua, St. Dominic, and St. Elizabeth were canonized by Gregory, who died in Rome, Aug. 21, 1241.

GREGORY X., of the illustrious family of Visconti, was elected Pope in 1271, after an interregnum of two years, at which time he was in the Holy Land. He assembled a council at Lyons, to promote a union between the Eastern and Western Churches, and other objects. Died in 1276.

GREGORY XI., PETER ROGER, a native of Limousin, in France, was a nephew of Clement VI., and son of the Count of Beaufort. He was elevated to the pontificate in 1370, after the death of Urban V., was a patron of learning, and endeavored to reconcile the princes of Christendom and to reform the religious societies. He transferred the papal see from Avignon to Rome, where he died in 1378.

GREGORY XII., ANGELO CORNARO, a native of Venice, was raised to the pontificate in 1406, during the schism in the East, Benedict XIII. being the other Pope. Both were deposed by a council held at Pisa, and Alexander V. elected in their stead. Gregory submitted, and laid aside the pontifical dignity. Died in 1417.

GREGORY XIII., BUONCOMPAGNI, a native of Bologna, and succeeded Pope Pius V. in 1572. He was deeply versed in the canon and civil law, and had distinguished himself at the Council of Trent. He ornamented Rome with many fine buildings and fountains; but his pontificate is chiefly memorable for the reformation of the calendar which took place under his auspices and bore his name (see GREGORIAN CALENDAR). Died in 1585.

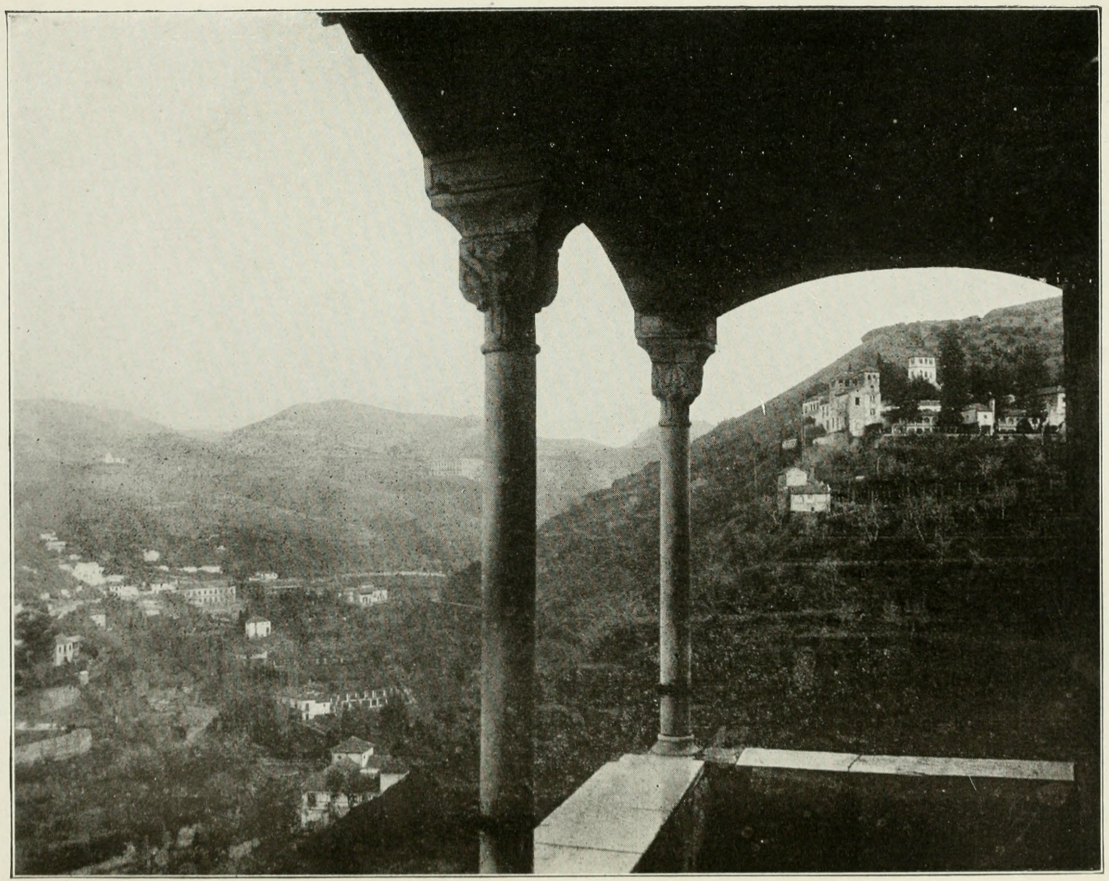
GREGORY XIV., NICHOLAS SFONDRATO, succeeded Urban VII., in 1550. He was the son of a senator of Milan, and involved himself in an unsuccessful war against Henry IV. of France. Died in 1591.

GREGORY XV., ALESSANDRO LUDOVICO, was a native of Bologna, and descended from an ancient family. He succeeded Paul V. in 1621, and was the founder of the College of the Propaganda. It was this Pope who, in 1622, canonized Ignatius Loyola, Francis Xavier, and Philip de Neri. He was author of several works, one of which is entitled "Letter to the King of the Persians," etc. (1627). He died in 1623.

GREGORY XVI., MAURO CAPPELLARI, born in Belluno in 1765, and succeeded Pius VIII., 1831. His pontificate was a period of no ordinary interest and difficulty in the history of the Church, and in the relations of the Vatican with the temporal powers of Christendom. Simple in his habits, though narrow in his ideas and timid in his manners, he nevertheless displayed great energy in conducting the affairs of the Church. He died in 1846 and was succeeded by Pius IX.

GREGORY, AUGUSTA (LADY). Irish authoress, née Persse. In 1880 she married Sir W. H. Gregory, whose autobiography she edited in 1894. She became interested in the Irish literary movement and finally published "Cuchulain of Muirthemne" and "Gods and Fighting Men," translations and paraphrases of old Irish epics which created much stir, by their idiom modeled on old Gaelic and the powerful breath of romance contained in them. She helped to establish in 1899 the Irish Literary Theater, now the Abbey Theater. Her chief books, including plays are: "The Kiltartan History Book"; "Poets and Dreamers"; "Visions and Beliefs"; "The White Cockade"; "The Full Moon"; "Seven Short Plays"; "Irish Folk History Plays"; "New Comedies."

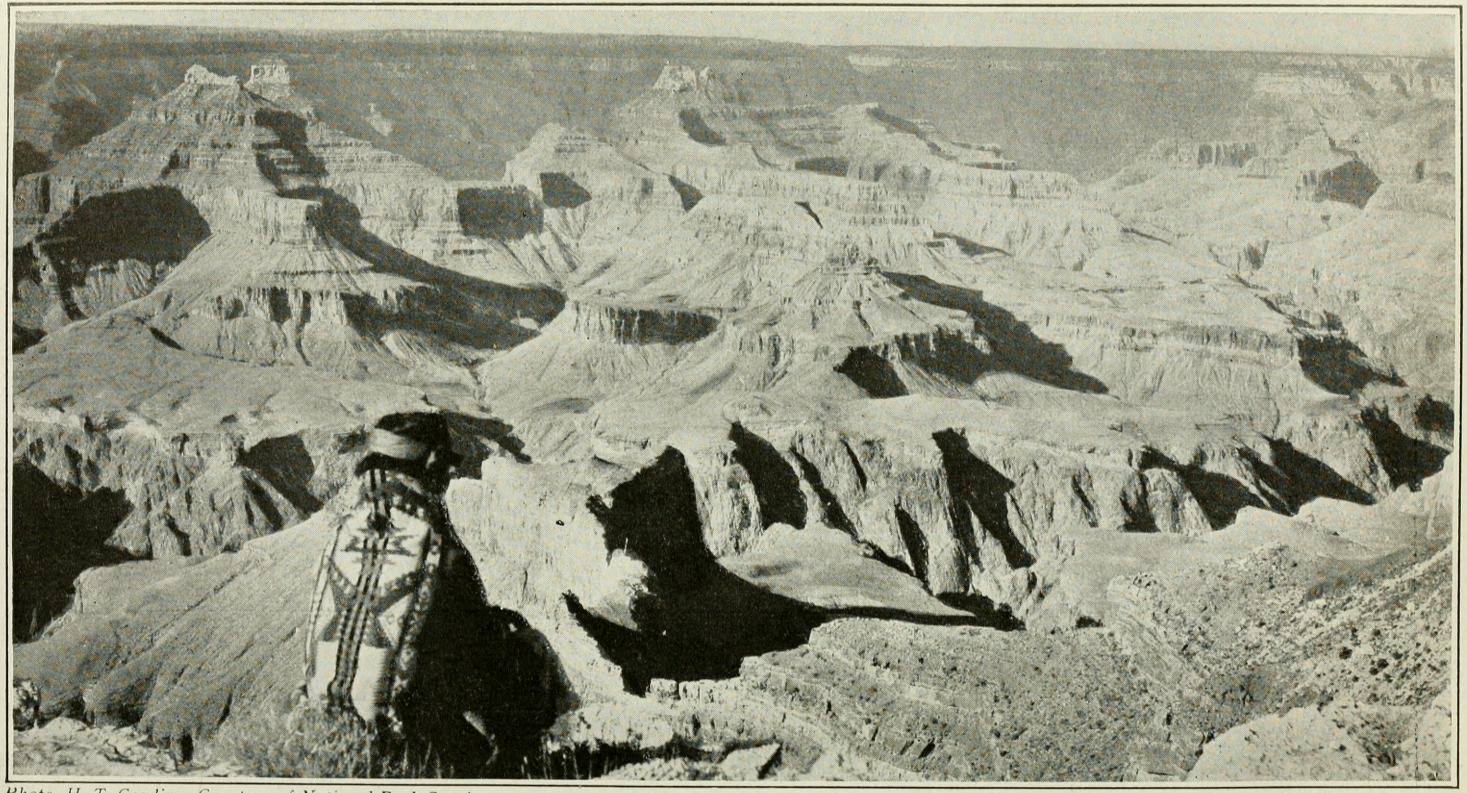
GREGORY, ST., surnamed Illuminator, the founder of the Armenian Church; born in Valarshabad, Armenia, about 257. He was of the royal Parthian race of the Arsacidæ, and son of Anak,



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OVERLOOKING GRANADA FROM A PORCH OF THE ALHAMBRA

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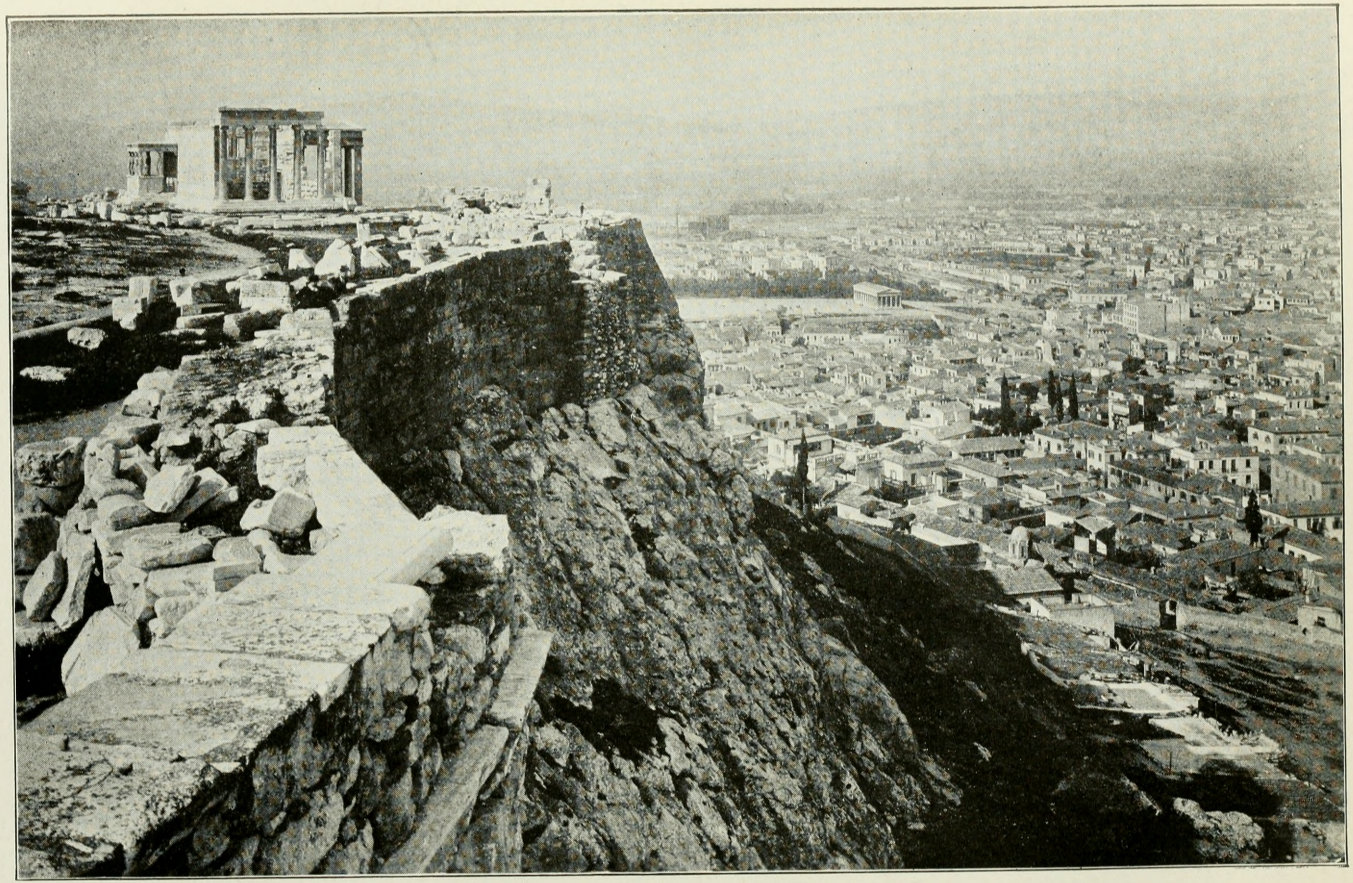
Photo, H. T. Cowling, Courtesy of National Park Service

THE CAÑON FROM RIM ROAD, GRAND CAÑON NATIONAL PARK, ARIZONA



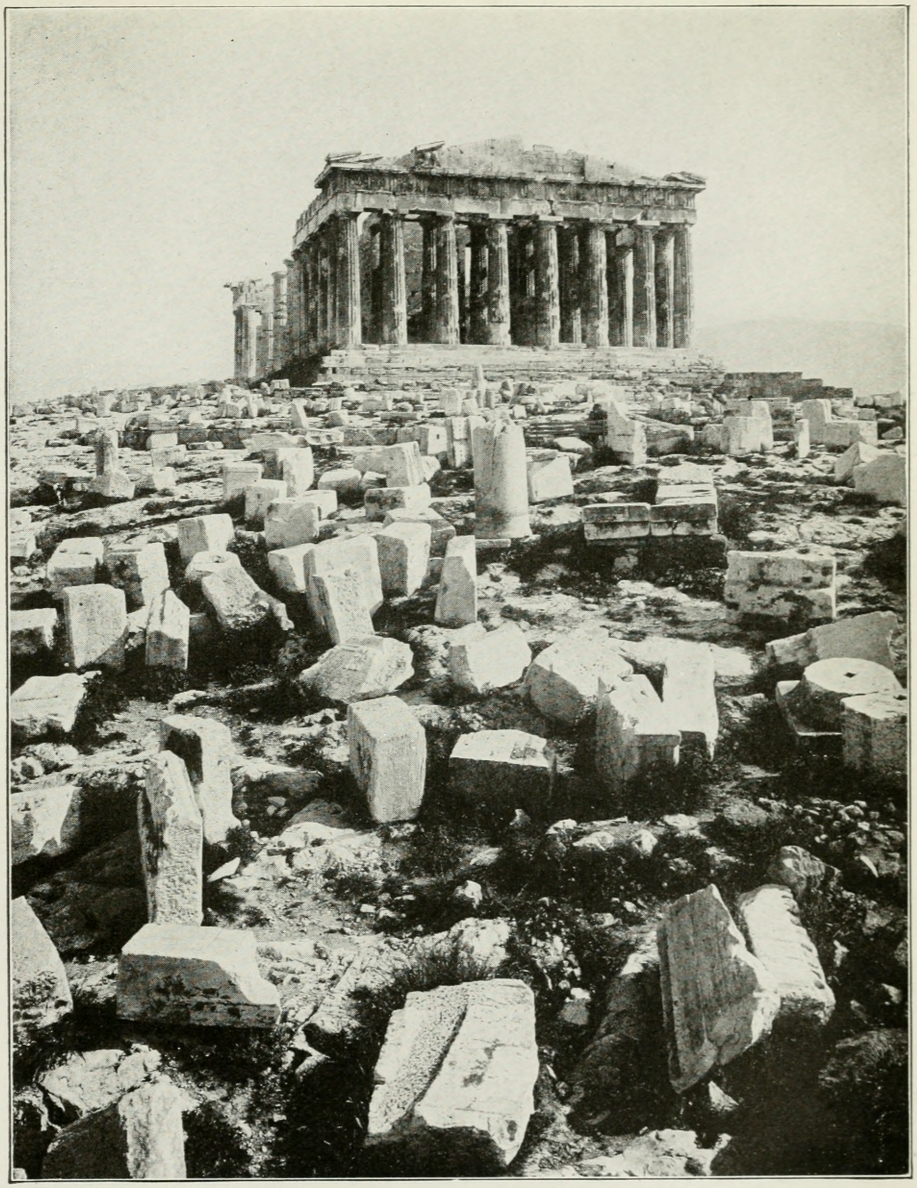
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GRAPEFRUIT, A VALUABLE PRODUCT IN FLORIDA AND OTHER SOUTHERN STATES



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CITY OF ATHENS, AS SEEN FROM THE ACROPOLIS



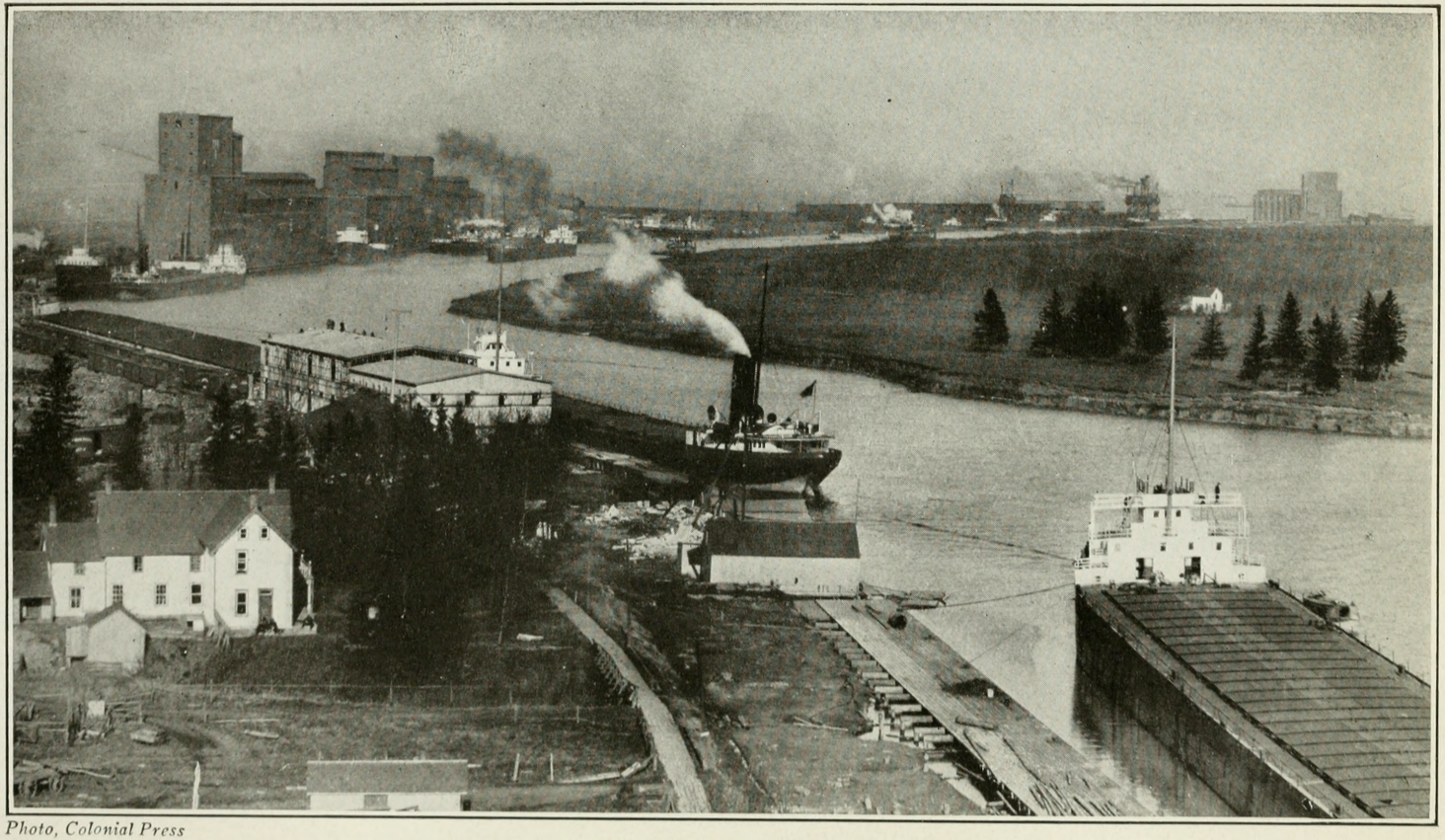
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THE PARTHENON AT ATHENS



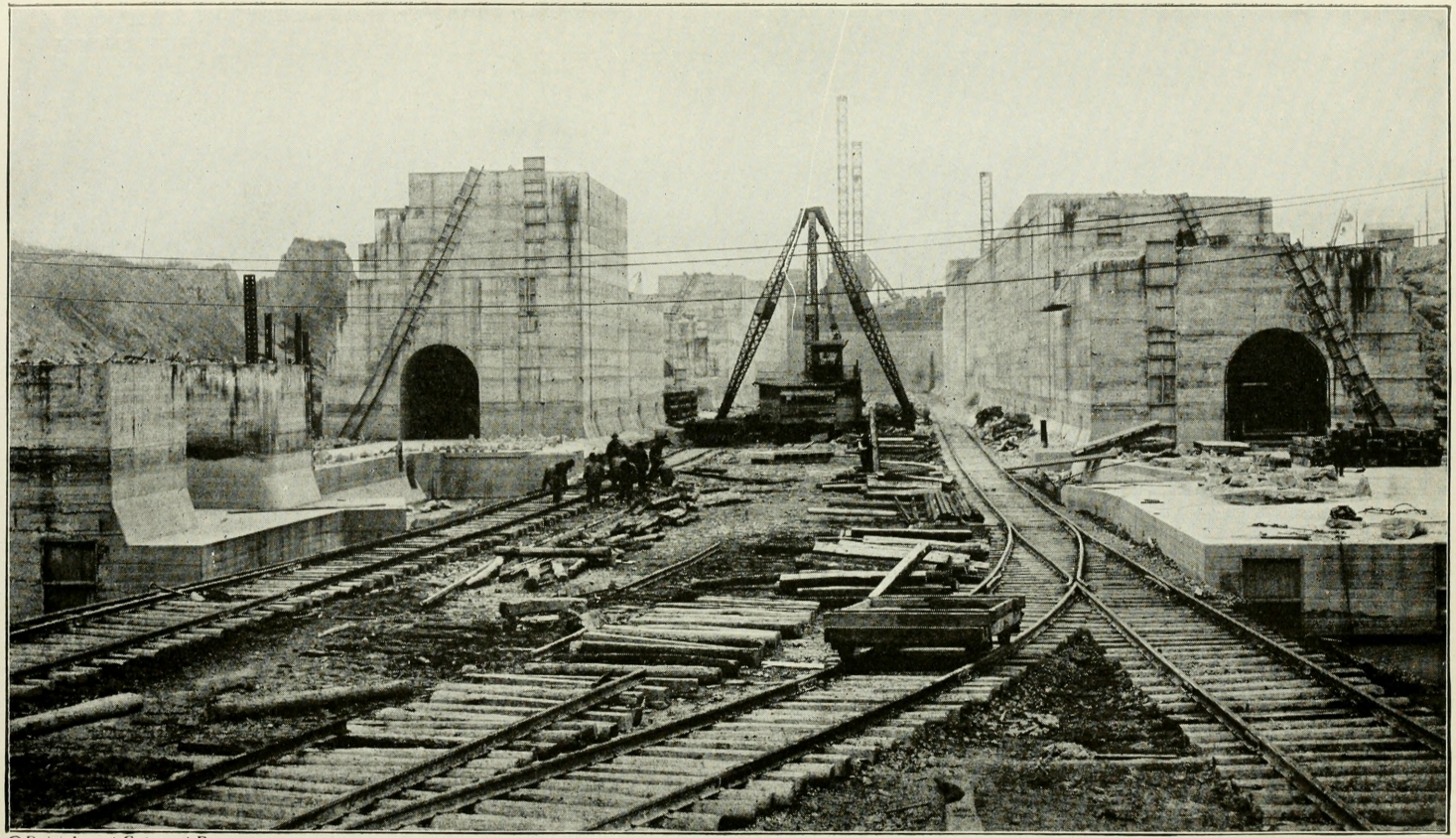
©*Photo by Ewing Galloway*

VESSELS LOADING AT CLEVELAND, OHIO, WITH A CARGO OF STEEL RAILS, WHICH WILL BE UNLOADED AT A CANADIAN PORT ON LAKE SUPERIOR



Photo, Colonial Press

HARBOR OF FORT WILLIAM, HEAD OF CANADIAN NAVIGATION ON LAKE SUPERIOR AND GRAIN PORT FOR THE CANADIAN WEST



©British and Colonial Press

CONSTRUCTION ON THE NEW WELLAND CANAL, AT HOMER. WIDTH, 80 FEET; GATES COMPLETED, 81.6 FEET HIGH

murderer of Chosrov I., King of Armenia. For this crime the whole family was slain save himself. He owed his escape to a Christian nurse, who secretly conveyed him, when he was 2 years old, to Cæsarea, in Cappadocia, her native town. He there married a Christian, who bore him two sons, and soon afterward became a nun. Gregory proceeded to Rome, and entered the service of Terdat, Chosrov's son. After Terdat (Tiridates III.) had, with the help of the Romans, recovered his father's kingdom (286), Gregory, for his refusal to crown with garlands the statue of Anahit, tutelary goddess of Armenia, was thrown by Terdat into a deep pit, where a pious widow nourished him for 14 years. About the end of that time Terdat was visited with the punishment of Nebuchadnezzar. Healed and baptized by Gregory, he became a zealous Christian, and established Christianity by force throughout his dominions. Gregory was consecrated bishop and head of the Armenian Church by Leontius, Archbishop of Cæsarea. Having resigned the patriarchate in favor of his second son Aristaces, Gregory in 331 retired to a cave at the foot of Mount Sebuh in Upper Armenia, where he died in 332.

GREGORY OF TOURS, a Frankish historian; born in Arverna (now Clermont), Auvergne, France, about 540. He belonged to one of the most distinguished Roman families of Gaul. Originally called Georgius Florentius, he assumed the name Gregory out of respect for his mother's grandfather, Gregory, Bishop of Langres. He was educated by his uncle, Gallus, Bishop of Clermont, and after his death by Avitus, a priest of his native town. Upon his recovery from a severe sickness Gregory resolved to devote himself solely to the service of the Church, and by the choice of the clergy and people and favor of Sigbert, King of Austrasia, to whom Auvergne had fallen on the death of Clothan I. in 561, he became Bishop of Tours in 573. He gave himself zealously to his sacred office and the public good. In the struggles between Sigbert and his wife Brunhilda on the one side against Chilperic and his wife Fredegond on the other he took the side of the former, and in the vicissitudes of a conflict in which Tours frequently changed masters had to suffer many persecutions. After the death of Chilperic he enjoyed great influence over his successors, Guntram and Childebert II. His fame rests on his "History, or Annals," the chief authority for the history of Gaul in the 6th century. He died in Tours, France, Nov. 17, 594.

GREGORY, THOMAS WATT, an American lawyer and public official; born at Crawfordsville, Miss., in 1861. He was educated at the Southwestern Presbyterian University of Clarksville, Tenn., the University of Virginia, and the University of Texas. Admitted to the bar in Texas in 1885, he practiced alone until 1900 when the firm of Gregory and Butts was formed. As special counsel for the State of Texas and as special assistant Attorney General of the United States, he took part in many of the government cases of prosecutions under the Sherman Act. In 1914 he was appointed Attorney-General of the United States by President Wilson, and served until 1919 when he resumed private practice in New York City.

GREIFSWALD (grīfs'vält), a town of Prussia, in the province of Pomerania; 2½ miles from the mouth of the Ryck and 25 miles S. E. of Stralsund. The university (founded in 1456) is equipped with medical museums, laboratories, etc.; the library contains about 135,000 volumes. There is a considerable shipping trade. The chief industries include the making of machinery, chains, and railway wagons, the curing of herrings, and iron-founding. Shortly after being made a town (1250) Greifswald joined the Hanseatic League. At the peace of Westphalia (1648) it came into the possession of Sweden; but together with the whole of Swedish Pomerania was ceded to Prussia in 1815. Pop. about 25,000.

GREIZ (grīts), a capital of the German republic of Reuss-Greiz, and formerly seat of its prince; on the White Elster, 47 miles S. S. W. of Leipsic. It contains three castles and a 13th-century church, and manufactures cotton and woolen goods, also cashmere and shawls, and possesses dyeworks and linen-printing establishments. The town was severely ravaged by fire in 1494, and again in 1802. Pop. about 23,000.

GRENADA (gre-nā'dä), an island of volcanic origin in the British West Indies, lying N. by W. from Trinidad; area, 133 square miles; pop. 67,000. Some of the craters in the central ridge of mountains, rising to 3,000 feet, have been transformed into large lakes; streams and mineral springs abound; there are several good natural harbors. The inhabitants, who are almost all negroes, cultivate cocoa, coffee, and oranges; a little rum is manufactured, and spices and fruits are grown. Capital and headquarters of the government of the Windward Islands, St. George's. Grenada has been a crown colony since 1885; previous

to that date it had a constitutional government. Columbus was the discoverer of the island in 1498.

GRENFELL, SIR WILFRED THOMASON, an English medical missionary, born near Chester, England, 1865, of an influential family and graduated from Oxford. He then studied medicine at London Hospital. In 1889, under the auspices of the Royal National Mission to Deep Sea Fishermen, he equipped a hospital ship to accompany the fishing fleets from the North Sea ports to Iceland. Three years later he went to Labrador and New Foundland, where he established hospitals at many points along the coast, making his headquarters at Saint Anthony. A large part of his time, however, is spent on the large steam hospital ship, "Strathcona," on which he visits all parts of the coast. He has also instituted a chain of cooperative stores among the fishermen making for their economic betterment. He wrote many books, chief of which are "Off the Rocks" (1906); "Down to the Sea" (1910); "Down North on the Labrador" (1911); "The Adventures of Life" (1912); etc.

GRENOBLE (gre-nō'bl), a fortified town of France; capital of the department of Isère, on the Isère, 60 miles S. E. of Lyons. Grenoble occupies both sides of the river, which is crossed by three bridges, and lined by fine quays. It has a cathedral, and a more noteworthy church (Saint-André), with the tomb of Bayard; a public library of 170,000 volumes; a college, museum, bishop's palace, court house, arsenal, and extensive public gardens. The manufactures consist of gloves, which may be considered the staple, linen and hemp goods, liquors, leather, etc. Grenoble existed in the time of Cæsar; and Gratian, who had improved it, changed its name from Cularo to Gratianopolis. Pop. about 80,000.

GRENVILLE, GEORGE, an English statesman; born Oct. 14, 1712; was younger brother of Richard Grenville, Earl Temple, and brother-in-law of the Earl of Chatham. He entered Parliament in 1714, and from 1744 to 1762 filled several government offices. In 1757 he introduced a bill for the regulation of the payment of the navy. In 1762 he became Secretary of State, and then First Lord of the Admiralty; and in the following year he succeeded Lord Bute as prime minister, uniting in himself the offices of Chancellor of the Exchequer and First Lord of the Treasury. The most prominent facts of his administration were the prosecution of Wilkes and the passing of the American Stamp Act, which first drove the American colonies to resistance. He resigned the premiership in 1765, and died in London, England, Nov. 13, 1770.

GRENVILLE, SIR RICHARD, an English naval officer; born about 1541; cousin of Sir Walter Raleigh. In 1585 he was given command of a fleet of seven vessels to aid in the colonization of Virginia. His most brilliant exploit occurred in 1591, when he attempted to cut his way through a Spanish fleet of 53 ships. His ship was becalmed and attacked by 15 of the largest Spanish vessels. Not till after 15 hours of battle and when only 20 out of his 150 men were left alive did he strike his colors. He died in September, 1591, from wounds received in the engagement.

GRESHAM, SIR THOMAS, an English financier; born in 1519; only son of Sir Richard Gresham. Apprenticed to his uncle, Sir John Gresham, a wealthy London mercer, and then sent to study at Gonville Hall, Cambridge, in 1543 he was admitted a member of the Mercers' Company, and in 1551 was employed as "king's merchant" at Antwerp. In two years he paid off a heavy loan, entirely restored the king's credit, and introduced a new system of finance. As a Protestant, he got his dismissal from Queen Mary, but on presenting a memorial of his past services, was soon reinstated. By Queen Elizabeth he was in 1559 knighted and appointed for a short time English ambassador at the court of the regent at Brussels. The troubles in the Netherlands compelled him, in 1567, to withdraw finally from Antwerp. In 1569, by his advice, the State was induced to borrow money from London merchants, instead of from other foreigners, to the great advantage of the mercantile body. Having in 1564 lost his only son, Richard, in 1566-1571 he devoted a portion of his great wealth to the erection of an Exchange in imitation of that of Antwerp, for the London merchants, who were wont to meet in the open air. Renowned for his hospitality and liberality, he frequently entertained foreign personages of distinction, and erected a magnificent mansion at Osterly Park, near Brentford, where he was visited by Queen Elizabeth. For the endowment of a college in London he directed by his will that his town mansion in Bishopsgate street should be converted into a residence and lecture rooms for seven professors, to be salaried out of the royal exchange revenues. He also provided for the erection and support of eight almshouses, and made many other chari-

table bequests. He died in London, England, Nov. 21, 1579.

GRESHAM, WALTER QUINTON, an American jurist; born near Lanesville, Harrison co., Ind., March 17, 1832. He became a member of the Indiana State Legislature in 1861; served in the Civil War, rising to Brigadier-General of volunteers; at its close resumed the practice of law, and in 1869 was appointed by President Grant United States District Judge for Indiana; in 1883 was appointed Postmaster-General by President Arthur; in 1884 became Secretary of the Treasury, and later was appointed one of the judges of the United States Circuit Court. He died in Washington, D. C., May 28, 1895.

GRETNA, a city of Louisiana, the parish-seat of Jefferson parish. It is on Morgan's Louisiana and Texas, the Texas and Pacific, and the New Orleans, Southern and Grand Isle railroads. The industries include manufactures of cotton seed oil, barrels, lard and soap, fertilizers, etc. The city is the seat of a Catholic college. Its notable buildings include a fine court house. It was incorporated in 1913. Pop. (1920) 7,197.

GRETNA GREEN, a village in Dumfriesshire, Scotland; near the head of the Solway Firth; 10 miles N. N. W. of Carlisle. After the abolition of Fleet marriages by Lord Hardwicke's Act (1754), English persons wishing to marry clandestinely had to get out of England, to which alone that act had reference. Thus the practice arose of crossing the border into Scotland, where Gretna Green, or Springfield, as the first village, had by 1771 become, a goal for runaway lovers. At the toll house nearly 200 couples were sometimes united in a year. One of the earliest Scottish runaway matches on record is Richard Lovell Edgeworth's (1763); among his successors were Lords Brougham, Dundonald, Eldon, and Erskine, besides numerous scions of the noble families of Villiers, Fane, Beauclerc, etc. In 1856 all irregular marriages were rendered invalid unless one of the parties had been residing in Scotland for three weeks previously; this proviso observed, a Gretna Green marriage is still possible.

GRÉVY, FRANÇOIS PAUL JULES (grā-vē'), a French statesman; born in Mont-sous-Vaudry, in the Jura, France, Aug. 15, 1813. He attended school and college near his native place. When not yet 20 he began to study law in Paris, and, becoming interested in politics, took part in the revolution of 1830, which drove Charles X. from the French throne. Possessing fine oratorical talents, he applied them to the defense of such radical republicans as were brought to trial for their share in this political outbreak. In this way he gained a reputation as an able republican orator, and when, in 1848, Louis Philippe was dethroned, and a republican government set up, Grévy became prominent. He was deputy to the Constituent Assembly in 1848, where he took a prominent part in the organization of the government. Being opposed to Louis Napoleon he was obliged to keep out of public affairs from 1852 to 1869, devoting these years to his profession. In 1869 the Jura again sent him to the national legislature. Napoleon's downfall revived republican activity. Grévy was chosen president of the National Assembly which met in 1871. In 1873, when the young republic seemed to be headed toward another monarchy, he advocated democracy as the only hope of France. In 1876, 1877, and 1879 he again represented the Jura in the French Parliament, and in the latter year he was chosen president of the republic by an enormous majority. In 1886 he was re-elected, but on account of a scandal in which his son-in-law was implicated was forced to resign Dec. 2, 1887. He died in Mont-sous-Vaudry, Sept. 9, 1891.

GREY, CHARLES, 2D EARL, an English statesman; born in Falladon, near Alnwick, Northumberland, England, March 13, 1764. He became in 1786 a member of Parliament, and in 1792 was one of the founders and most active members of the "Society of the Friends of the People." In 1797 he brought forward a motion for parliamentary reform, for which he continued to labor strenuously, though he was for many years unsuccessful in carrying the object of his wishes. When Lord Grenville, in 1806, came into office, Grey, as Lord Howick, became First Lord of the Admiralty, and, as one of the leaders of the House of Commons, carried the act for the abolition of the slave trade. In the following year the cabinet was broken up, and he, in the same year, succeeded to the title by the death of his father. In the House of Lords he became one of the leaders of the opposition. For many years he remained out of office; but in 1830 he was called on by William IV. to form a new cabinet. He accordingly became prime minister, and announced "peace, retrenchment, and reform" as the objects of his policy. In 1831 the Reform Bill was introduced by Lord John Russell into the House of Commons; but in the following year the ministers resigned, on account of a motion of Lord Lyndhurst. They were restored to power, however,

and in the same year the bill was passed. In the succeeding year Earl Grey resigned, and, after about two years, retired from public life. He died July 7, 1845.

GREY, EDWARD, VISCOUNT OF FALLADON, a British statesman, born in Northumberland in 1862. He received his education at Winchester and at Balliol College, Oxford. His political career began in 1885, when he entered Parliament as the member for Berwick-on-Tweed, which constituency he continued to represent thereafter as a Liberal. In 1892 he became Under-secretary of State for Foreign Affairs and held that post until 1895. He was prominent thereafter by his opposition to the continuance of the Liberal party's alliance with the Irish Nationalist group, in which attitude he followed the



EDWARD GREY, VISCOUNT OF FALLADON

leadership of Lord Rosebery. He was made Privy Councilor in 1902. He became Secretary of State for Foreign Affairs in December, 1905, which position he held until 1916. During his tenure of office he rose, in the estimate of his political intimates and opponents, to a degree of dominance in the field of international diplomacy that marked him as the foremost diplomatist of his day. His continuance in office and the facility with which he pressed his policies to successful conclusion and commanded the confidence of the diverse domestic political factions was effected in spite of an attitude of reticence unknown to the traditions of the Foreign Office previous to his time. No British statesman, since the Crimean War, has commanded such complete influence in the councils of Europe. He united Great Britain, France, and Russia in the Triple Entente, although his efforts to develop more cordial relations between Great Britain and the German Empire definitely failed, due to incompatibility of national aspirations which his diplomacy was powerless to overcome. His action in 1908, when Austria annexed Bosnia and Herzegovina, strained the relations between Great Britain and Austria and subjected his country to a diplomatic defeat in consequence of the failure of other European Powers to acquiesce in his demand that the action of Austria be submitted to a conference of the Powers. His position became plainer in 1911, during the affair between Germany and France over Morocco, when the firmness of his stand against any expansion of German influence into the region of north Africa led to a definition of the British attitude in response to the protest of the German Foreign Office that Great Britain had no right to interfere as an interested party to the settlement of the dispute. Hereafter, Great Britain stood committed to the policy of preserving the status quo in so far as concerned those spheres of influence then existing and subject to the control of the leading national states. In 1912 Russia gained some slight advantage in Persia in consequence of the Anglo-Russian entente of 1907. He displayed his mastery as an international diplomatist in the Balkan crisis in 1912 when, as protagonist, he assembled the conference of European ambassadors in London and directed their deliberations to a successful, if temporary peace. Although the strength of his influence had enabled him to avert the European conflict in 1912, he was powerless to prevent the affair between Bosnia and Austria from involving the nations in 1914, and the elaborate diplomacy of years left him, in that event, with only one alternative to commit Great Britain to war against the Central Empires in defense of the declaration of 1911 and the preservation of national limitations. Following the World War, he visited the United States upon a special mission to promote understanding and cordiality between the two nations.

GREY, LADY JANE, the "nine days' queen"; born in Bradgate, Leicestershire,

England, in October, 1537; was the eldest daughter of Henry Grey, Marquis of Dorset and Duke of Suffolk, and great-granddaughter of Henry VII. of England. As a girl she made extraordinary progress, especially in languages—Latin, Greek, French, Italian, and Hebrew. In 1553 the Duke of Northumberland, foreseeing the speedy death of the boy-king, Edward VI., determined to change the succession and secure it to his own family. Lady Jane, not 16 years old, was therefore married, strongly against her wish, to Lord Guilford Dudley, Northumberland's fourth son, on May 21, 1553; and July 9, three days after Edward's death, the council informed her that his "plan" had named her as his successor. On July 19, the brief usurpation over, she found herself a prisoner in the Tower; four months later, pleading guilty of high treason, she was sentenced to death, and was beheaded on Tower Hill, Feb. 12, 1554.

GREY, ZANE, an American novelist, born at Zanesville, Ohio, in 1875. He graduated from the University of Pennsylvania in 1896. After practicing dentistry from 1898 to 1904, he abandoned this to follow a literary career. He wrote "Betty Zane" (1904); "The Last Trail" (1907); "The Heritage of the Desert" (1910); "Riders of the Purple Sage" (1912); "Wild Fire" (1917); "Desert of Wheat" (1919); and "Man of the Forest" (1920).

GRIDLEY, CHARLES VERNON, an American naval officer; born in Logansport, Ind., in 1845; entered the United States navy in September, 1860; was promoted midshipman July 16, 1862; commander, March 4, 1868; and captain, March 14, 1897; and shortly after was ordered to the Pacific station. When he reached Hong Kong, China, he was placed in command of the cruiser "Olympia," the flagship of the Asiatic fleet. On the morning of May 1, 1898, after the American fleet entered Manila Bay, Captain Gridley took his position in the conning tower of the "Olympia" and Commodore Dewey stood on the bridge. As soon as the American ships drew within range of the Spanish fleet Commodore Dewey gave the brief command: "You may fire when you are ready, Mr. Gridley," and in a few minutes the battle began. Captain Gridley skillfully managed the "Olympia" during the engagement and delivered the broadside which destroyed the flagship of the Spanish fleet. Though very ill, he commanded his ship throughout the fight. Shortly after his sickness became more serious, and he was ordered home, but died on reaching Kobe, Japan, June 4, 1898.

GRIEG, EDVARD (grēg), a Scandinavian composer; born in Bergen, Norway, June 15, 1843; entered the conservatory at Leipsic in 1858, where he remained for four years; then continued his studies at Copenhagen. He went to London in 1888, where he both played and conducted. Among the best known of his compositions are "Humoresken" (for the piano); "Songs"; the "Peer Gynt" suite; "Norwegian Folk-Songs"; "Ligurd Jorsalfa"; "Norwegian Dances"; etc. He died Sept. 4, 1907.

GRIFFIN, a city of Georgia, the county-seat of Spalding co. It is on the Central of Georgia and the Southern railroads. Its industries include cotton mills and towel manufactories. It is the seat of a State agricultural experiment station. Pop. (1910) 7,478; (1920) 8,240.

GRIFFIS, WILLIAM ELLIOTT, an American clergyman; born in Philadelphia, Pa., Sept. 17, 1843; was graduated at Rutgers College in 1869 and at the Union Theological Seminary in 1877; spent several years in Japan teaching and organizing schools; became pastor of the First Congregational Church of Ithaca, N. Y., in 1893. He is the author of "The Mikado's Empire"; "Corea, the Hermit Nation"; "Japan: In History, Folklore, and Art"; "Brave Little Holland and What She Taught Us"; "The Religions of Japan"; "First American Envoy in Japan"; "The Japanese Nation in Evolution" (1907); "Story of New Netherland" (1909); "Belgium" (1912); "The Mikado" (1915); "Dutch Fairy Tales" (1918).

GRIGGS, EDWARD HOWARD, an American lecturer and author, born at Owatonna, Minn., in 1868. He graduated from Indiana University in 1889, and took special courses at the University of Berlin. For several years he was instructor, assistant professor, professor, and lecturer on ethics at Leland Stanford Jr. University. In 1899 he became public lecturer on economics and ethical subjects. His writings include "The New Humanism" (1900); "Self-Culture Through the Vocation" (1914); and "The Soul of Democracy" (1918). He was a member of many learned societies.

GRIGGS, JOHN WILLIAM, an American lawyer and public official, born in Newton, N. J., in 1849. He graduated from Lafayette College in 1868. After studying law, he was admitted to the bar in 1871, and engaged in practice at Paterson, N. J. He was a member of the State Assembly and Senate from

1875 to 1888. In 1896 he was elected Governor of New Jersey, but resigned in 1898 to become Attorney-General in the cabinet of President McKinley. He resigned his post in 1901 to become a member of the Permanent Court of Arbitration at The Hague. In this capacity he served until 1908, when he again engaged in the practice of law.

GRILLPARZER, FRANZ (gril'pärtser), an Austrian poet and dramatist; born in Vienna, Jan. 15, 1791. "Blanche of Castile," a tragedy, written at 17, and "Spartacus," a tragedy, showed genius; but "The Ancestress," first called popular attention to him. "Sappho," a tragedy, made him eminent in scholarship also. "The Golden Fleece," "The Argonauts," and "Medea" constitute a trilogy. "The Career and End of King Ottokar," "A True Servant of His Master," and "Woe to Him Who Lies" demand mention; but his poem "Waves of Ocean: Thrills of Love" is the supreme manifestation of his art. "In Thy Camp Is Austria," a poem of the times, created a sensation. Later works of note are "The Jewess of Toledo," "Fraternal Strife in the House of Hapsburg," and "Libussa," plays published posthumously; and a story, "The Poor Minstrel." He died in Vienna, Jan. 21, 1872.

GRIMALDI, JOSEPH, a noted English pantomimist; born in London, England, Dec. 18, 1779. He first appeared on the boards of Drury Lane at two years old, and in his third year he had his first engagement at Sadler's Wells Theater, where he regularly performed (except for one season) till his retirement from the stage, prematurely worn out by hard work, in 1828. Charles Dickens edited his "Memoirs" (1838). He died in London, May 31, 1837.

GRIMM, JAKOB, a German philologist; born in Hanau, Hesse-Cassel, Jan. 4, 1785. He was educated at the University of Marburg, and in 1805 spent some months at Paris as assistant to Savigny. Three years later he was appointed librarian to Jérome Bonaparte, King of Westphalia. On the overthrow of the new kingdom of Westphalia, in 1813, he was made secretary of legation under the restored electorate, and in that capacity was present at the Congress of Vienna. He held the office of sub-librarian to the elector from 1816 till 1829, his younger brother, Wilhelm, being also employed in the library. In the latter year he became first librarian to the University of Göttingen, which post, with a professorship, he held till 1837. In that year he was dismissed, as was also his brother, from his similar office, for protesting against the violation of the constitution of the King of Hanover. In 1841 they both settled in Berlin, as professors in the university, and members of the Academy of Sciences, where they were commonly known as the Brothers Grimm. Under that name also they have a certain immortality in the affections of the children of the civilized world. Jakob wrote: "German Grammar"; "German Mythology"; "History of the German Language." The great "German Dictionary," their joint production, was left unfinished by them. The well-known "Children's and Family Tales" was also their joint work. Jakob died in Berlin, Sept. 20, 1863.

GRIMM, WILHELM, a German philologist, brother of the preceding; born in Hanau, Hesse-Cassel, Feb. 24, 1786. For the facts of his life, see GRIMM, JAKOB. He edited many old German texts, and collaborated with his brother Jakob in several of his works. His own most important book is "German Heroic Legends" (1829). His "Minor Writings" (1881-1886) contain an autobiography. He died in Berlin, Dec. 16, 1859.

GRIMSBY, or **GREAT GRIMSBY**, a parliamentary and municipal borough and seaport of Lincolnshire; on the right bank of the Humber, 20 miles E. S. E. of Hull and 41 N. E. of Lincoln. The parish church, a good cruciform edifice in the Early English style, was restored in 1859. A statue of the prince consort was unveiled in 1879, and a public park of 27 acres opened in 1883. The town is the largest fishing port in Great Britain, being mostly engaged in the cod, herring, and whelk fisheries. The industries include shipbuilding, tanning, brewing, cordage-making, and flax-dressing. Pop. about 78,813.

GRINDELWALD (-vält), one of the most beautiful valleys (3,468 feet) of the Bernese Oberland in Switzerland, about 12½ miles long and 4 broad; it forms the approach to the two Grindelwald glaciers; it is recommended as a winter health resort.

GRINDING, CRUSHING AND PULVERIZING MACHINERY. The process of reducing solids from large fragments to small particles may be accomplished by various means which may be classified as under:

(1) *Breaking*, as when a stone is broken by a sledge-hammer.

(2) *Crushing*, exemplified by the crushing of sugar with a rolling pin.

(3) *Grinding*, accomplished by introducing the material between two surfaces, of which one may be stationary and the other rotating, or both of which may rotate but in opposite directions.

The surfaces may be smooth, as in the pestle and mortar; abrasive, as in some disc machines; or one or both surfaces may be corrugated and so exert a cutting action, as in the ordinary household coffee mill.

On a large scale, all these methods of reducing material to a more or less fine state of division are utilized, and the various mechanical devices on the market merely carry out these processes on a large scale, the particular merit of any machine depending upon the efficiency with which it accomplishes its purpose and the amount of energy it absorbs in doing so. For reducing rocks, coal and similar material from large lumps to fragments of 1 inch mesh breakers are used. These are of various types, the simplest being the *Jaw Breaker*, which, as the name implies, consists of two jaws, one fixed and the other movable. The movable jaw is attached to an eccentric, and moves backward and forward as the eccentric revolves. When the jaw moves backward a V-shaped opening is formed, the rock is fed in, and then the V closes, crushing the rock between the heavy jaws.

The *Gyratory Breaker* consists of a gyrating head on to which the rock is fed and crushed against stationary concaves. The gyrating head is attached to a vertical shaft, fixed to an eccentric at the base. When the eccentric revolves, the resulting action is similar to that of a pestle being moved around a mortar by the hand, except that both pestle and mortar are inverted. A modification of the same principle is shown in the *Symons Disc Breaker*. In this machine, two discs are employed, of very hard steel. The discs are concave, and are set at an angle to each other, with their hollow sides facing. Both discs are rotated in the same direction and at the same speed, but a gyrating motion is imparted to one of them by means of an eccentric, and owing to the angle at which they are set their outer edges are wider apart at one point, and close together at another. The rock is fed through the center of one disc, and as the discs come together it is crushed and discharged.

Crushers are usually of the roller type and are much used for reducing ores from 2 inch to ¼ inch size, or even smaller. The crushers are heavy steel rollers, both of which revolve, but one of which is on fixed bearings while the other is supported on bearings which are held in place by heavy springs and therefore have a certain amount of "give."

The earliest type of pulverizing machine was the "stamp mill," and even today it is commonly used. The principle upon which it works is the raising of a heavy weight by means of a cane, and then letting it fall by gravity on to the material to be crushed. The stamps sometimes weigh as much as a ton and are usually arranged in a battery of five, or more. Some of the modern stamping machines impart crushing force to the stamps by means of steam instead of relying on gravity.

At the present time the commonest form of pulverizer is the Ball Mill or Tube Mill in one or other of its many modifications. The principle of all these mills is the same. The mill consists of a revolving cylinder, partially filled with steel balls or flint pebbles. The material to be pulverized is fed into the mill, and as the cylinder revolves the balls or pebbles are carried round and continually fall over one another. The crushing action is partly due to the impact of one ball falling against another, partly to the grinding action of the constantly moving surfaces of the balls. Ball mills are of the intermittent or "batch" type; tube mills are continuous, the coarse material being fed in one end, and the fine material discharged at the other. The Hardinge Conical Mill is a special type of tube mill, and consists of two cones connected by a short cylinder. The feed cone is of very wide angle, the discharge cone of much smaller angle. Pebbles of mixed sizes are commonly used in this mill, and the conical shape brings about a segregating action on the pebbles, the larger sizes being carried to that part of the mill having the greatest diameter, and vice versa. The same segregation occurs, of course, with the material being ground, and the result is that the coarse particles automatically collect in that part of the mill where grinding action is the greatest. The Raymond Pulverizer is of an entirely different type. It depends for its grinding action on revolving rollers, which themselves rotate about a central axis. It also makes use of the principle of air-separation, the finer particles being continuously carried away by a circulating current of air, and collected in a dust collector, while the coarser particles fall back for further grinding. By this device a very finely-ground product can be obtained, and high grinding efficiency is also claimed for the machine.

Another type of mechanical grinder which finds application in the paint and drug trade is the Buhr Stone Mill, which consists of two horizontal stone discs, the lower one of which revolves, while the upper one is stationary. The surfaces of the stones are furrowed, and the material is fed through the center of the upper stone and is collected at the pe-

riphery. The stones are commonly water-cooled. These mills are very successful in grinding liquid or semi-liquid mixtures.

GRINGORE (gran-gōr′), or **GRINGOIRE** (gran-gwär′), **PIERRE**, a French dramatist and satiric poet; born between 1475 and 1480. He early became known as a writer of moral and allegorical poems, next of satirical farces abounding in allusions to the social and political circumstances of the time. He is an important figure in literary history as one of the creators of the French political comedy. In later life he entered the service of the Duke of Lorraine as a herald, and confined his muse to religious poetry alone. He wrote: "The Game of the Prince of Blockheads" (1511), directed especially against Pope Julius II.; "The Foolish Undertakings," "The Hunt for the Stag of Stags," and the famous "Mystery of St. Loys" (about 1524). He died in 1544.

GRINNELL, a city of Iowa, in Poweshiek co. It is on the Chicago, Rock Island and Pacific and the Minneapolis and St. Louis railroads. Its industries include the manufacture of gloves, washing machines, aeroplanes, carriages, etc. The notable public buildings include a Carnegie library, and the city is the seat of Grinnell College. Pop. (1910) 5,036; (1920) 5,362.

GRINNELL, GEORGE BIRD, an American editor and author; born in Brooklyn, N. Y., in 1849. He was the editor of "Forest and Stream." His works deal principally with Indian life and folklore. Among the best known are: "American Game Bird Shooting"; "The Story of the Indian"; "Pawnee Hero Stories and Folk Tales"; "The Fighting Cheyennes."

GRINNELL LAND, a barren, mountainous Polar tract, in lat. 80° N., separated from Greenland by Smith Sound and Kennedy Channel. It was discovered by Lieut. E. J. De Haven, and named after Henry Grinnell, of New York. Lieut. A. W. Greely thoroughly explored it. N. and S. it is covered with ice-caps; between them lie valleys that lose their snow in summer, and support herds of musk oxen and the usual Arctic fauna. In the interior Greely discovered Lake Hazen, 65 miles long, and two ranges of mountains, one containing a peak (Mount Arthur), 5,000 feet high.

GRIP, or **LA GRIPPE**, a disease which frequently becomes an epidemic in different parts of the United States and Europe and in the East and West Indies. It is believed to be contagious and is somewhat similar to influenza. The symptoms are fever, headache, swelling and pain in the smaller joints, eruption of the skin, etc. It is also known as "dengue," and, in the Southern States, as "break-bone fever." The disease is produced by bacilli which, when magnified, appear somewhat like goose eggs in form and substance. They are usually discovered in pairs, and where the disease has attacked a person are abundant in the lung and bronchial tissues, and in the nasal and salivary secretions. They are imbibed in breathing, and will not breed except in a temperature of at least 80°, yet no degree of natural cold can kill them. When in a temperature below that mentioned they remain in a dormant state. In 1892, the grip germ was discovered in Berlin by Prof. Robert Pfeifer, who observed that it breeds by lengthening itself and then dividing in the middle. This operation requires about 20 minutes, and wonderful as it may seem, is continued until it produces 16,500,000 germs in 24 hours.

GRIQUALAND (grē′kwa-) **WEST** and **EAST**, two British districts of south Africa, part of the colony of Good Hope, named from the Griquas or Bastaards, a mixed race sprung from Dutch settlers and native women. GRIQUALAND WEST lies to the N. E. of Cape Colony, is bounded on the S. by the Orange river, on the N. by Bechuana territory, on the E. by the former Orange Free State, now called Orange River Colony, on the W. by the Kalahari country; area, 15,197 square miles; pop. about 110,000. Portions of the country are suitable for sheep farming and agriculture, but the chief source of wealth is the diamond fields. The first diamond was discovered in 1867. Diamonds to the value of $75,000,000 were found there between 1883 and 1887. KIMBERLY (*q. v.*), which has had railway connection with the Cape since 1885, is the chief center of the diamond industry and the seat of government. The chief towns are De Beers, Du Toit's Pan, Bultfontein, Barkly, and Griqua Town. Griqualand West is now incorporated in the Cape and constitutes four of the 71 divisions. GRIQUALAND EAST, area, 7,594 square miles; pop. about 225,000. This territory was annexed to the Cape in 1875, and is now under colonial rule, having one chief magistrate and nine subordinates. Chief village, Kokstadt.

GRISI, GIULIA (grē′sē), an Italian singer; born in Milan, May 22, 1812. Her father (Garcia) was an officer of engineers in the army of Napoleon I., and her aunt the once famous cantatrice

Josephine Grassini. She made her début at Bologna in a contralto part, appeared in "Romeo and Juliette" at Florence and at Milan, and made her first appearance in Paris and London in 1834, as Ninetta in "La Gazza Ladra," where she achieved a decided success. Every part which she assumed afterward steadily increased her reputation, which may be said to have been established by her impersonation of the queen in "Semiramide," and of Donna Anna in "Don Giovanni." Her fame reached its climax in her rendition of the rôles of "Norma" and "Lucrezia Borgia," in which characters her singing and dramatic acting have never been surpassed. She was twice married; on the second occasion to the unrivaled tenor Signor Mario Marquis de Candia, with whom she visited the United States in 1854, singing in the principal cities. She died in Berlin, Nov. 29, 1869.

GRIS-NEZ (grē-nā'), **CAPE**, a headland 164 feet high, in the department of Pas-de-Calais, France, opposite Dover, is the point of land nearest to the English shore, the distance being barely 20 miles. About equally distant from Calais on the N. E. and Boulogne on the S., the cape marks the dividing line between the North Sea and the English Channel. It is surmounted by a lighthouse.

GRISONS (grē-zôn'), or **GRAUBÜNDEN**, a canton of Switzerland; the largest and the most thinly peopled; bounded by Tyrol and Lombardy; area, 2,773 square miles; capital, Chur. The whole canton is an assemblage of mountains intersected by narrow valleys. These last form three groups, of which the first and most important lies along the course of the Rhine, and stretches N., occupying nearly the whole of the W. portion of the canton; the second, forming the Engadine, extends N. E. along the course of the Inn; and the third comprises several smaller valleys, whose streams run S., belonging to the basins of the Ticino and the Adige. Pastures and forests occupy a large portion of the canton; cattle and timber are the principal exports. Numerous mineral springs are found within the canton; also the health resorts of Davos, the Upper Engadine, Seewis, etc. Iron, lead, copper, zinc, and silver occur. Within the Grisons, too, are several passes leading to Italy, such as the Splügen, St. Bernardino, Bernina. The country was anciently inhabited by the Rhætii, who are supposed to have been of Etruscan race. It was conquered by the Romans under Augustus, and added by Charlemagne to his empire in 807. During the Middle Ages the Bishop of Chur was the most powerful of the numerous nobles who sought to oppress the people, till they in self-defense formed themselves into leagues. One of these leagues, formed in 1424, was called the gray league from the gray homespun worn by the unionists, and hence the German and French names of the canton—Graubünden and Grisons. In 1471 these separate unions entered into a general federation, which then (1497-1498) formed an alliance with the Swiss cantons. Pop. about 125,000.

GRISWOLD, ALEXANDER VIETS, an American clergyman; born in Simbury, Conn., April 22, 1766; ordained in the Protestant Episcopal Church in 1795; made bishop over "The Eastern Diocese," including all of the New England States except Connecticut, in 1811. His publications include "The Reformation and the Apostolic Office" (1843); "Discourses on the Most Important Doctrines and Duties of the Christian Religion" (1830); etc. He died in Boston, Mass., Feb. 15, 1843.

GRIZZLY BEAR, a huge bear, sometimes 9 feet from the nose to the end of the very short tail, and weighing 800 pounds. The hair, which varies between gray and blackish brown, is more or less grizzled, whence the animal's English name. It inhabits North America, especially the Rocky Mountains. It feeds partly on fruits and roots, and partly on animal food.

GROAT, a name given in the Middle Ages to all thick coins, as distinguished from the "bracteates" or thin coins of silver or gold-leaf stamped so as to be hollow on one side and raised on the other. The silver groat current in England, introduced by Edward III., was equal to four pence. The coin was revived in 1836-1856 in the modern fourpenny piece. Groschen, the German equivalent of groats, were till 1873-1876 current in the N. of Germany, and equal in value to one-thirtieth of a thaler, worth 2¼ cents, United States currency.

GRODNO (grod'nō), a town of Poland; on the Niemen, 148 miles N. E. of Warsaw. It has a medical academy and prior to the World War had manufactures in cloth and tobacco. The palace erected by Augustus III. of Poland, is a handsome edifice. At first a Russian town, Grodno fell to Lithuania in 1241. Here Stephen Bathori died in 1586; here in 1793 the Polish diet ratified the second partition of Poland; and here, too Stanislaus Augustus, the last King of Poland, abdicated in 1795. The city was successively captured by Russians and Aus-

trians during the World War and was also in the field of the Russo-Polish campaigns of 1920. Pop. about 64,000.

GROIN, in anatomy, the hollow in the human body where the thigh and the trunk unite. In architecture, the angle or angular curve formed by an intersection of vaults; most of the vaulted ceilings of the Middle Ages were groined, and therefore called groined ceilings. During the early part of the Norman style the groins were left purposely plain, but afterward they were invariably covered with ribs.

GROMWELL, the name of plants of the genus *Lithospermum*, natural order *Boraginaceæ*, containing a number of widely distributed species, several of which are natives of America. The seeds of *L. officinale* are occasionally used as a diuretic.

GRONINGEN (grō-ning'gen), a city and capital of the province of Groningen (area, 881 square miles; pop. (1918) 359,950), Netherlands, 25 miles S. W. of Delfzihl, on Dollart Bay. The university, founded in 1614, possesses a library, a botanic garden, an observatory, a collection of Teutonic antiquities, a hospital, and a museum of natural history. A celebrated deaf and dumb institution was founded by Guyot in 1790. Groningen, already an important place in the 9th century, joined the Hanseatic League in 1282. From the 11th century it fought hard to maintain its independence against the bishops of Utrecht, nor did it submit until 1493, and then only to escape being handed over by the emperor to the Duke of Saxony. During the 16th century it had a very stormy history, being finally won for the United Netherlands by Maurice of Nassau in 1594. Pop. (1918) 87,594.

GRONNA, ASLE J., an American public official; born at Elkader, Clayton co., Iowa, in 1858; raised on a farm, he received his education in the schools of Houston co., Minn., and at Caledonia Academy. In 1879 he went to South Dakota, became a banker and acquired wide agricultural interests. He was a member of the Territorial Legislature in 1889 and later served in the House of Representatives in the 59th, 60th, and 61st Congresses. Elected United States Senator in 1911 for the unexpired term of Martin N. Johnson, he was re-elected to the Senate for the full term in 1915. During his service in the Senate he allied himself with the progressive group of Republican Senators and in 1917 became one of the most determined opponents of the entrance of the United States in the World War, as well as of other policies of President Wilson. He was a regent of the University of North Dakota.

GROSBEAK, or **GROSSBEAK**, in ornithology, the English name of *Coccothraustinæ*, a sub-family of *Fringillidæ*. The cardinal grosbeak, an American bird. The pine grosbeak is *Loxia enucleator*, called also pine bullfinch; and the social or republican grosbeak is *Philæterus socius*. It is from south Africa, and belongs to the sub-family of *Ploceinæ*, or weaver birds.

GROSSMITH, GEORGE. An English actor. He was born in 1874 and was educated at University College, London, and at Paris. First acted in London in "Haste to the Wedding" operetta, and made his first hit in the "Morocco Bound," after which he appeared in "Go Bang," "The Gaiety Girl," and other musical plays in England and the United States. Played in the United States with Mrs. Langtry in "The Degenerates," after appearing in its successful production in London. Has played at the Gaiety Theater, London, since 1900, with the exception of some appearances in New York and Paris. Part author of the "Spring Chicken," "Havana," "The Girls of Gottenburg," and "Peggy." He first popularized the "revue" in England.

GROSSWARDEIN (grōs'vär-dīn), or **NAGY-VARAD** (nody'vä-rod), a town of Bihar co., Hungary; on the Sabes Körös, 152 miles S. S. E. of Pest. Formerly a fortress, it is now the seat of a Roman Catholic and of a Greek bishop, has several churches, and prior to the World War manufactured spirits, oil, vinegar, tiles, matches, pottery, and wine. In the neighborhood is the Bishop's Bath, with alkaline sulphur springs. At Grosswardein peace was concluded between Ferdinand I. of Austria and John Zapolya of Transylvania in 1538. It was taken and pillaged by Turks in 1660, and remained in their hands till its recapture by the Austrians in 1692. Pop. about 65,000.

GROSVENOR, EDWIN AUGUSTUS, an American educator, born at Newburyport, Mass., in 1845. He graduated from Amherst College in 1867, and from 1873 to 1890 he was professor of history at Robert College. He afterward served on the faculty of Amherst College as professor of history and modern government, from 1892. He traveled much in Europe and Asia and was widely known as a lecturer on historic and diplomatic subjects. He contributed many articles to encyclopædias, magazines, and re-

views. He wrote "The Hippodrome of Constantinople and Its Still Existing Monuments" (1899); "Constantinople" (1895); "Contemporary History of the World" (1899). He was the editor of the "Reference History of the World" (1909).

GROSVENOR, GILBERT HOVEY, an American editor, born at Constantinople, Turkey, in 1875. He was educated at Robert College, Constantinople, and graduated from Amherst College in 1897. After teaching for two years in Englewood, N. J., he became associate editor of the "National Geographic Magazine." He was appointed managing editor in 1900 and editor-in-chief in 1903. In 1899 he was director of the National Geographic Society, and was made its president in 1920. He wrote "The Explorations of the 19th Century" (1900); "The Land of the Best" (1916); and "Flags for the World" (1917). He contributed numerous articles to magazines. He was appointed associate editor of the "Proceedings of the 8th International Geographical Congress" in 1905.

GROTE, GEORGE, an English historian; born in Clayhill, Kent, Nov. 17, 1794; died in 1871; educated at Sevenoaks and at the Charterhouse, he entered in 1810 his father's banking establishment. In 1832 he was elected a member of Parliament for the city of London, and his subsequent parliamentary career, until his retirement in 1841, was principally devoted to the advocacy of vote by ballot. He was also a leader of the "Philosophic Radicals." In 1846 appeared the first two volumes of his "History of Greece"; the 10th and final volume being published in 1856. In 1865 he published "Plato and the Other Companions of Socrates," and was engaged at the time of his death on "Aristotle and the Peripatetics." In the latter part of his life he was concerned in the management of University College, the London University, and the British Museum. He died in London, June 18, 1871.

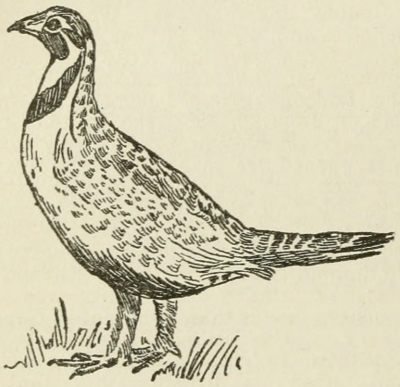
GROTIUS (grō'shi-us), or **DE GROOT, HUGO** (grōt), a Dutch statesman; born in Delft, Holland, April 10, 1583. In 1599 he commenced his career as advocate; and he was successively appointed historiographer, advocate-general of Holland and Zealand, a member of the states-general, and envoy to England. In 1613 he became cyndic, or pensionary, of Rotterdam, and declaring himself on the side of Barneveldt, he supported him and the cause of the Arminians. But he narrowly escaped the fate of Barneveldt, who suffered on the scaffold, and received sentence of imprisonment for life in the fortress of Lœwestein. From this, however, at the expiration of 18 months, which he had employed in writing his celebrated "Treatise on the Truth of the Christian Religion," he succeeded in escaping. This was effected by the management of his wife, who contrived to have him carried out of the castle in a chest. Grotius at first sought an asylum in France where he composed his great work, "The Justice of War and Peace." After an absence of 12 years, he returned to his native country, but was condemned to perpetual banishment. He passed the remnant of his life in the diplomatic service of Sweden.

GROTON, a town in New London co., Conn., on the Thames river and Long Island Sound, opposite New London. There still may be seen Fort Griswold, memorable for the massacre of an American garrison by the British in 1781. The British having captured the fort after a desperate resistance, Colonel Ledyard, the American commander, surrendered to the officer of the detachment, and was immediately killed with his own sword, most of his men being also butchered. A granite monument, to commemorate that event, was erected in 1830. Pop. about 2,000.

GROUCHY, MARQUIS EMMANUEL DE (grö-shē'), a French military officer; born in Paris, Oct. 23, 1766; entered the army at 14; threw in his lot with the Revolution, and had his first taste of serious work in helping to suppress the Vendean revolt. After being nominated second to Hoche for the abortive expedition to Ireland, though Grouchy did enter Bantry Bay, he proceeded to join Joubert in Italy in 1798. Under Moreau he greatly distinguished himself in Piedmont, and at Novi was taken prisoner but subsequently exchanged in 1799. Later he fought with conspicuous gallantry at Hohenlinden, Eylau, Friedland, Wagram, and in the Russian campaign of 1812, being appointed during the memorable retreat leader of the bodyguard of Napoleon. After the disastrous battle of Leipsic, Grouchy covered the retreat of the French on the W. side of the Rhine. Among the first to welcome Napoleon after his escape from Elba, Grouchy destroyed the Bourbon opposition in the S. of France, and then, hastening N., routed Blücher at Ligny. After the defeat at Waterloo and the second abdication of Napoleon, Grouchy, appointed by the provisional government commander-in-chief of the broken armies of France, led them skillfully back toward the capital; then, resigning, he went to the United States. He returned

from exile in 1819, and was reinstated as marshal in 1831. He died in St. Etienne, May 29, 1847.

GROUSE, in ornithology, various game-birds, specially the *Tetrao tetrix*, called the black grouse, and *Lagopus scoticus*, the red grouse. The male of the former is called the black cock, and the female the gray hen. The red, called also the common grouse, inhabits moors. Besides *Tetrao*, the grouse family contains the genus *Lagopus* (Ptarmigan), etc., the ruffled grouse is the genus *Bonasia;* sand grouse are the family *Pteroclidæ;* and the wood grouse is the *Capercailzie*. They are well known to be large plump birds, with beautifully varie-



SAGE GROUSE

gated plumage, which must often be protective. They are especially abundant in the N. parts of both Old and New World. The male is famous for his habit of drumming, or beating stiffly downward with his wings. The largest American grouse is the cock of the plains or sage cock.

GROVE, in comparative religion, a group of trees under which religious worship is held.

GROVE, SIR GEORGE, an English author; born in Clapham, England, in 1820; was trained as a civil engineer, and erected in the West Indies the first two cast-iron lighthouses built. As a member of the staff of Robert Stephenson he was employed at the Chester general station and the Britannia tubular bridge. He was secretary to the Society of Arts from 1849 to 1852, and secretary to the Crystal Palace Company from 1852 to 1873, where he subsequently became a director. He was editor of "Macmillan's Magazine," a large contributor to Smith's "Dictionary of the Bible," and editor and part author of the "Great Dictionary of Music and Musicians." D. C. L. from Durham University in 1872, and LL. D. of Glasgow in 1886. He was knighted in 1883 on the opening of the Royal College of Music, Kensington Gore, of which he was made Director by the Prince of Wales. He also assisted Dean Stanley in some of his works on the Bible and the East, and was founder of the Palestine Exploration Fund. He died in London, England, May 28, 1900.

GROVE CITY COLLEGE, a nonsectarian coeducational institution in Grove City, Pa.; founded in 1876; reported at the close of 1919: Professors and instructors, 54; students, 859; president, W. C. Ketler.

GROW, GALUSHA AARON, an American legislator; born in Eastford, Conn., Aug. 31, 1822; was graduated at Amherst College in 1844; was admitted to the bar in 1847; settled in Towanda, Pa., and there practiced; was a member of Congress in 1851-1863 and speaker during the last two years. In 1871-1876 he was president of the International and Great Northern railroad of Texas. In 1894 he was elected Representative-at-Large by a plurality of 297,446 over DeWitt, the Democratic nominee, and a majority of 269,778 over all other candidates, these being the largest numbers of votes ever given in any State of the Union to any candidate for any office up to that time. He was re-elected in 1896, 1898, and 1900. He died March 31, 1907.

GUADALAJARA (gwä″dä-lä-hä′rä), a town of Guadalajara province, Spain; on the Henares, 35 miles N. E. of Madrid. It has manufactures of flannel and serge, and a royal college of engineering. Here is the quaint, neglected palace of the Mendozas.

GUADALAJARA, city and capital of the State of Jalisco, Mexico, and the second city of the republic; in a valley by the Rio Grande de Santiago, here crossed by a fine bridge of 26 arches, 280 miles W. N. W. of Mexico City, with which the place is connected by rail. Though most of the houses are of only one story, the town presents a pleasing appearance. Guadalajara is the seat of an archbishop, and possesses a handsome cathedral, besides the government palace, a mint, university, hospitals, and school of art. Its industries are important; it is the chief seat of the cotton and woolen manufactures of the country, and the Guadalajara pottery and metal wares, like the confectionery, have a reputation all over Mexico. Pop. about 120,000.

GUADALQUIVIR (gwä-THäl-kē-ver'), a river known to the ancients by the name "Baetis," rises in the Sierra de Cazorla, Spain, on the borders of Jaen and Murcia, 15 miles E. S. E. of Ubeda, and passes Andejar, Cordova, Seville, and San Lucar-de-Barameda. The Guadalquivir receives on the right the Guadalimar, Campana, Guadamelleto, Guadabarbon, Guadiato, and Biar; on the left, the lesser Guadiana, Guadalentin, Jaen, Guadajoz, Xenil, and Corbones. It falls into the Atlantic at San Lucar, after a winding course of about 250 miles.

GUADALUPE (gâ-dä-löp'), a river rising among the mountains in Kerr co., Tex,; flows a general E. and S. E. course through Blanco, Comal, Guada, Gonzales, De Witt, and Victoria counties, and enters Espiritu Santo Bay between Calhoun and Refugio counties.

GUADALUPE-HIDALGO (gwä-thä-lö'pā-ē-däl'gō), a village of the Federal District in Mexico, at the foot of Guadalupe mountain; 5 miles N. of Mexico City. It has a famous brick cathedral, the richest in all Mexico. Here is preserved a miraculous picture of a brown Virgin, painted on a peasant's coarse cloak. The treaty which ended the war with the United States was signed here, Feb. 2, 1848. Pop. about 6,000.

GUADELOUPE (gwäd-löp'), one of the Leeward Islands; a French colony. It is divided into two distinct parts by a narrow arm of the sea called Rivière Salée. The larger portion, or Guadeloupe proper, has an area of about 305 square miles, and is of volcanic origin. A ridge of hills traverses it N. and S., the highest points of which are La Soufrière, an active volcano, about 5,108 feet in height, and the extinct volcanoes La Grosse-Montagne, Les Deux Mamelles, and Le Piton-de-Bouillant. The other portion, Grand-terre, has an area of about 300 square miles, and is generally low, never rising to more than 115 feet above the sea-level. The principal exports are sugar, coffee, dye, cabinet woods, tafia, hides, copper, etc. The principal town, St. Louis, or Point-à-Pitre, was destroyed by an earthquake in February, 1843. Guadeloupe was discovered by Columbus in 1493, and named by him Santa Maria de la Guadalupe. In 1635 it was taken by the French, who held it till 1759, when the English gained possession of it, after which it changed owners several times, till the peace of 1814 restored it to the French. Pop. (1918) 117,219.

GUAIACUM, a genus of *Zygophyllaceæ*, tribe *Zygophylleæ*. *Guaiacum officinale* is an ornamental tree with blue flowers, growing in Jamaica. The wood furnishes *Lignum vitæ;* its resin is called gum guaiacum. The leaves of *G. sanctum* are used in the West Indies as a substitute for soap. The bark and wood of both species are used as sudorifics, diaphoretics, or alteratives.

GUALEGUAYCHÚ (-chō'), a town of Entre Rios, Argentine Republic, on the Gualeguaychú river. Besides slaughtering and salting works, it has an extract of beef factory.

GUAM (gwäm), an island in the Pacific Ocean, the largest of the Marianne or Ladrone group; area, 200 square miles; capital, Agaña. The island is fertile and to a great extent covered with valuable timber lands. There are 18 schools and about 90 per cent. of the natives can read and write. At the beginning of the American-Spanish War the Ladrone group belonged to Spain, and on June 20, 1898, the United States cruiser "Charleston," on its way to Manila, opened fire on Agana. The Spanish garrison, not knowing that war existed, and thinking the attack was a salute, sent an officer to the "Charleston" apologizing for not returning it, owing to lack of ammunition. When they learned the state of affairs, the place was surrendered in less than 30 minutes. Captain Leary, of the United States navy, was appointed the first American governor, and under his direction important reforms were instituted. Slavery was abolished, and a break-water and fortifications were built at the harbor of San Luis d'Apra, to establish a coaling station there. United States money has been in circulation since 1909. Pop. 13,275. See AGAÑA.

GUANAJUATO (gwä-nä-hwä'tō), a State of Mexico; area, 11,370 square miles. The greater part of the surface belongs to the lofty plateau of Anahuac, and is traversed by the Sierra de Gorda in the N. and the Sierra de Guanajuato (11,030 feet) in the center; the S. W. portion belongs to the fertile plain of Bajio. The riches of Guanajuato consist chiefly in its valuable mineral products; there are large numbers of gold, silver, lead, copper, and quicksilver mines worked. Stock-raising is of some importance, but agriculture is little pursued, although the soil yields most products of both the temperate and tropical zones; a noteworthy article of export is chillies. Large cotton and woolen factories have been established by foreigners. Pop. State, 1,086,000.

GUANAJUATO, city and capital of Guanajuato, Mexico, on both sides of a

deep ravine, traversed by a mountain stream that in the rainy season is swelled to a foaming torrent. The streets are steep and tortuous, the houses frequently of four or even five stories. The public buildings include a large government palace, a mint, barracks, a cathedral, several convents and colleges, an art school, and the Alhondiga, a public granary. It is a mining town; its handsomest private houses belong to the wealthy proprietors of mines, and it contains several amalgamation works, others lining the cañon for several miles. There are also blanket factories and cotton printing works, electric lights and telephones. Pop. about 36,000.

GUANO (gwa'nō), a grayish-white, yellowish, dark brown, or reddish substance. It is a bone phosphate of lime or osteolite with some impurities. Found in islands off the Peruvian and other South American coasts, also in those off the coast of Africa and elsewhere. Guano from different localities has been differently named. It has been called pyroclasite, pyroguanite, sombrerite, and glaubapatite. Guano is formed by the droppings of multitudinous birds, in secluded places where they have been undisturbed for ages.

GUÁNTÁNAMO (gwän-tän-ä'mō) **BAY**, a harbor of southern Cuba, 38 miles E. of Santiago. To the right of the entrance is a range of rocky hills; on the left the shore is low and swampy. It was just outside of this bay that United States war vessels, during the early part of the war with Spain, tried to cut the cables which extended from Santiago to Guantánamo and thence to Spain. On May 18, 1898, the "St. Louis" and the tug "Wampatuck" endeavored to get into the mouth of the harbor, but the Spanish batteries and a gunboat in the bay opened up such a severe fire that the "Wampatuck" was forced to withdraw, after grappling a cable about 800 yards from the shore. On June 10, the United States cruiser "Marblehead" shelled the hills on the right of the bay where the enemy had erected earthworks, and the next day the transport "Panther" landed 600 marines at Caimanera, Cuba. In July, 1901, Guantánamo Bay was selected by the United States Government as the site of one of four projected naval stations on the Cuban coast. The construction was completed in 1916. Pop. of district about 51,100.

GUAPORÉ (gwä-pō-rā'), a river of South America, rises in Brazil, and for some distance forms the boundary between Bolivia and Brazil. It unites with the Mamore to form the Madeira.

GUARDAFUI (gwär-dä-fwē') **CAPE**, the extreme E. point of the African continent, and the extremity of an immense promontory, the Somali country, stretching seaward in an E. N. E. direction, and washed on the N. W. by the Gulf of Aden and on the S. E. by the Indian Ocean.

GUARINI, GIOVANNI BATTISTA (gwä-rē'nē), an Italian poet; born in Ferrara, Dec. 10, 1537; studied at Pisa, Padua, and Ferrara, and was appointed to a chair at Ferrara. At the age of 30 he accepted service at the court of Ferrara, and was intrusted by Duke Alfonso II. with various diplomatic missions. His chief and most popular work, "The Faithful Swain," passed through 40 editions in the author's lifetime, though it is really an imitation of Tasso's "Aminta." He died in Venice, Oct. 4, 1612.

GUATAVITA (gwä-tä-vē'tä), a village of the republic of Colombia, 20 miles N. E. of Bogotá. Previous to the Spanish conquest it was a town of great importance, and on the banks of the Lake of Guatavita near it are the ruins of many once magnificent and venerated Peruvian temples.

GUATEMALA (gwä-tä-mä'lä), a republic of Central America, bounded by Mexico, Belize, Honduras, San Salvador, Gulf of Honduras, and the Pacific Ocean; area, 48,290 square miles; pop. about 2,000,000. Number of departments, 22; and capital, Guatemala la Nueva. Pop. 90,000.

Topography.—The country is exceedingly mountainous and elevated, the main chain of the continuation of the Andes traversing it S. E. to N. W., and sending off numerous branches. Along the main chain are a number of volcanoes, among which are Fuego, over 12,000 feet high, which sends forth torrents of water, and Tajumulco, 14,403 feet high. The country is well watered by numerous streams, none of much importance. There are several lakes, the most important being Dulce, through which a great part of the foreign trade of the state is carried on, Amatitlan, Atitlan, and Peten.

Climate and Productions.—On the tableland, of which a considerable portion of the state is formed, the climate is mild; but in more elevated situations the cold is intense. There is much valuable timber. The soil generally is of great fertility, producing, according to altitude, soil, etc., maize, wheat, rice,

coffee, cotton, tobacco, sugar, cochineal, cacao, indigo, vegetables, and tropical fruits in great variety. Fiber plants are numerous, including ramie, henequen, and others. In the altos or mountainous parts of the N. W. considerable flocks of sheep are raised, the wool of which is manufactured into coarse fabrics. There were in 1919 about 1,500 coffee plantations under cultivation, producing about 100,000,000 pounds annually. Over 50 per cent. of the coffee plantations of the country were owned by Germans. The yield of sugar, which is next after coffee, the most important product, is about 45,000 pounds annually. Other important agricultural products are bananas, beans and wheat. The department of Peten is rich in mahogany and dye woods of which there is a considerable trade in the United States. The chicle, or gum industry, also has its center in this province. About 500,000 pounds are obtained annually. Cotton is grown in small quantities. There are deposits of silver, gold, copper, iron, and lead, but these are little developed on account of the lack of transportation.

Commerce.—The total imports in 1918 amounted to £1,326,800, and the exports to £2,263,800. The most important imports are cotton, foodstuffs, linen, hemp and jute, paper, iron and steel, and leather. The most important exports are coffee, bananas, sugar, hides, timber, and rubber. The greater part of the trade is with the United States. The exports to the United States for the fiscal year 1920 amounted to $16,347,595, and the exports from the United States amounted to $10,309,233. In 1919 600 vessels, with about 700,000 tons, entered the ports of the republic.

Communciations. — The Guatemala railway, 195 miles in length; the Guatemala Central railway, 139 miles; the Occidental railway, 51 miles; and the Ocos railway, 22 miles, were incorporated in 1912 as the International Railway of Central America. The main line extends from Puerto Barrios to Guatemala City, a distance of about 194 miles, then to San José de Guatemala on the Pacific Ocean, a distance of about 75 miles. A further addition to the railroad was purchased in 1914 and an extension was built in the same year. Additional railway construction was under way in 1920. There are about 5,000 miles of telegraph wire and about 535 miles of telephone wire.

Education.—Education is free and compulsory for all children between the ages of 6 to 14. There are about 2,000 government schools, including primary schools, training schools, night schools, and rural schools, and about 60,000 pupils in the elementary schools. The University of Guatemala was established in 1918. The total expenditure for education is about $160,000 annually.

Finance.—The revenue in 1919 was $110,937,325, and the expenditure $77,666,023. The external debt was about $7,000,000 and the internal debt $135,799,843.

Government.—The country is governed under a constitution by which the legislative power is vested in a National Assembly, consisting of representatives chosen by universal suffrage for four years, and a council of state of 13 members, partly elected by the National Assembly and partly appointed by the president. The president is elected for a term of six years. There are departments of foreign affairs, government and justice, hacienda and public credit, public construction, fomento, and war.

History.—Ancient Guatemala was occupied by a race of Indians who had reached a high state of civilization at the time of the early Spanish invaders. It was conquered by Alvarado, a lieutenant of Cortez, and until 1824 was under Spanish rule, although independence was declared in 1821. Guatemala was a member of the Central American Confederation from 1824 to 1839, and several times since has attempted to bring all the Central American republics into a union, but without success, until 1897, when she signed a treaty of union with Costa Rica, and the Greater Republic of Central America, which was, however, soon after dissolved.

Manuel Estrada Cabrera was elected president in 1898. During his administration much was done to improve educational and economic conditions. He was re-elected in 1905, but shortly afterward was accused of endeavoring to become dictator and a revolt was organized by General Barillas. This threatened to involve all the Central American countries in war, but by the intervention of President Roosevelt and Diaz an armistice was arranged in 1906 which was later incorporated into a treaty between the Central American countries. Guatemala in 1907 joined in the Central American peace conference which provided for a Central American court of justice. Cabrera was elected for a third term in 1910. Difficulties arose with Great Britain in regard to the debt owed to British citizens by Guatemala, and in 1913 the United States undertook to arrange matters with Great Britain and took over the supervision of the finances of the country. Guatemala broke off

diplomatic relations with Germany in April, 1917. The British minister to Guatemala had been active in stirring up plots and intrigues against the United States in all of the Central American States. President Cabrera was re-elected in 1917 for an additional six-year term. Guatemala City was almost completely destroyed in January, 1918. A treaty of peace was approved by Congress on Oct. 7, 1919. President Cabrera was deposed in a revolution which broke out in April, 1920. Dr. Carlos Herrera became provisional president. Cabrera was accused of being a dictator and endeavoring to use his office for personal ends. He had been in power for 22 years. The new government was recognized by the United States on June 24, 1920. Herrera was chosen permanent president on Aug. 29.

GUAYAQUIL (gwī-ä-kēl'), a city and capital of Guayas province, Ecuador; in the valley of the Guayas, 30 miles above its mouth. Most of the houses are built of bamboo or wood and earth, and covered with creepers. The custom house is the most noteworthy of the public buildings, which include a cathedral and a townhall. In 1889 a statue to Bolivar was erected. The leading manufacturing establishments are combined steam sawmills, foundries, and machine shops; and the place is noted for its straw hats and hammocks. Cocoa represents five-sixths of the exports, which include coffee, ivory nuts, rubber, hides and specie. The city has gas lights, street railways, and an improved waterworks system. It was founded by Orellana in 1537, and removed to its present site in 1693. Pop. (1919), 93,851.

GUAYMAS, a well-sheltered port of Mexico, on the Gulf of California, the terminus of the Sonora railway (353 miles S. by W. of Benson, an Arizona station on the Southern Pacific railroad). It is a small place, excessively hot, surrounded by barren mountains, and mostly inhabited by Indian fishermen; but already it exports precious metals, wheat, flour, etc., in considerable quantities, and its trade is increasing.

GUBBIO, the ancient Iguvium or Eugubium, a city of central Italy, on the S. W. declivity of the Apennines, 20 miles N. N. E. of Perugia. It has a 13th century cathedral, several mediæval palaces, the Brancaleoni with a valuable picture-gallery, and remains of an ancient theater. The celebrated Eugubine Tables are preserved in the town house. Gubbio was noted for its majolica ware, which was brought to perfection by Giorgio Andreoli in 1517-1537, by his delicate use of a beautiful ruby luster. Two celebrated yellow lusters were also used on Gubbio majolica.

GUBEN (gö'ben), a town and river-port in the province of Brandenburg, Prussia, at the head of the navigable portion of the Neisse, 28 miles S. of Frankfort-on-the-Oder. The town was destroyed by the Hussites in 1434 and 1437, and was twice occupied by the Swedes during the Thirty Years' War. Pop. about 38,600.

GUELDERLAND (gel'der-länt), or **GUELDERS** (gel'derz), a province of the Netherlands, between the Zuider Zee on the N. W. and the Prussian dominions on the S. E.; area, 1,965 square miles. It is watered chiefly by the Meuse, the Yssel, the Rhine, and the Waal. It was originally inhabited by the Batavi and Sigambri, and after them by the Franks. In 870 it passed to Germany; and in the end of the 11th century became a territorial power, its ruler bearing the title of count. This was exchanged for the higher title of duke in 1383, and in 1483 the duchy was taken possession of by Maximilian of Austria. Yet it was not till 1543 that the power of the Duke of Guelders was finally broken and his land definitely incorporated with the Austrian Netherlands. By the peace of 1814 Guelders was finally divided between Holland and Prussia. Pop. (1918) 727,165.

GUELF, or **GUELPH** (gwelf), the name of a family, which in the 11th century was transplanted from Italy to Germany, where it became the ruling race of several countries. The family, until the World War, continued in the two lines of Brunswick, the royal in England, and the ducal in Germany. For their history, see GHIBELLINES.

GUELPH, a city, port of entry, and capital of Wellington co., Ontario; on the Speed river, 45 miles W. by S. of Toronto. It is the seat of the Ontario Agricultural College, and has several flour mills, woolen mills, and manufactories of sewing machines, the Speed supplying abundant motive power. Pop. about 15,200.

GUERILLA (ge-ril'la), an irregular mode of carrying on war by means of small, independent bands of armed men, self-constituted and ordered, unconnected with a regular army, and entitled to dismiss themselves at any time. Guerilla warfare is mainly carried on in a country occupied by an enemy.

GUERIN, JULES, an American artist, born in St. Louis, in 1866. He studied

art in Paris and was awarded the silver medal at the St. Louis Exposition in 1904. He was director of color and decoration at the Panama-Pacific Exposition. He painted decorations for the Lincoln Memorial at Washington, and for the Pennsylvania Station in New York City. He was an associate of the National Academy, and was a member of the National Institute of Arts and Letters.

GUERNSEY (gern'zi), the second-largest and most W. of the Channel Islands, lying off the N. coast of France, 46 miles from Cherbourg, and about 68 miles from Start Point in Devonshire. It is of a triangular form, area 19 square miles. The N. part is level, the S. more elevated, coast lofty and abrupt, the island being almost entirely of granite formation. The climate is extremely healthy. The soil is fertile. The breeding of cattle and the dairy are the principal objects of attention; and the butter made is highly esteemed. Horticulture and floriculture also receive much attention, and fruit, especially figs and grapes, is very abundant. The grape-houses are further utilized for the raising of early vegetables and tomatoes, which are sent to the London market. The principal exports are cattle, fruits, vegetables in the early spring; granite for paving, etc. The dialect of the island is the pure Norman of some centuries ago; but a knowledge of English is general. The principal educational institution is Elizabeth College, at St. Peter's Port, the capital, and only town in the island. Steamers ply regularly between Guernsey and London, Southampton, Plymouth and Weymouth. The island is under a lieutenant-governor, who represents the sovereign in the assembly of the states, a kind of local parliament. It is strongly fortified, and has a well-organized militia. Pop. (1919) 45,000.

GUERRERO (ger-rā'rō), a State of Mexico, on the Pacific Ocean; area, 24,996 square miles; capital Chilpancingo. It is a broken mountainous country, rich in minerals, fertile in the upland valleys, and enjoying a favorable climate except on the coast. Pop. (1917) 620,416.

GUESCLIN, BERTRAND DU (gā-klan'), Constable of France; born near Dinan in the district of Rennes, about either 1314 or 1320. From his boyhood upward he excelled in all martial exercises. In the contests between Charles de Blois and Jean de Montfort for the dukedom of Brittany he took part with the former, especially distinguishing himself at Vannes (1342). After King John had been taken prisoner by the Black Prince at the battle of Poitiers in 1356, Du Guesclin contended successfully against the English, his valor and military skill being especially shown at Rennes (1356) and Dinan (1357). Then, entering the service of the Dauphin, afterward Charles V., he took Melun (1359) and several other fortified towns, and freed the Seine from the English. On Charles' accession to the throne in 1364 Du Guesclin was created governor of Pontorson, and in May of the same year gained the battle of Cocherel against Charles the Bad of Navarre. But on Sept. 29 following he was defeated and taken prisoner by the English, under Sir John Chandos, at the battle of Auray, and only liberated on payment of a ransom of 100,000 livres. He next supported Henry, Count of Trastamare, against Pedro the Cruel, King of Castile, but was defeated and taken prisoner by the Black Prince near Najera (1367). Being again ransomed on payment of a large sum, Du Guesclin renewed the contest, and in 1369 defeated and captured Pedro at Montiel, and placed the crown of Castile on the head of Henry of Trastamare. Immediately afterward he was recalled by Charles V. of France, at that time hard pressed by the English, and was raised to the dignity of Constable of France. In the year 1370 Du Guesclin opened his campaigns against the English, and in a few years the whole of their possessions were in the hands of the French, with the exception of a few fortified towns. While assisting at the siege of Châteauneuf de Randon, in Languedoc, Du Guesclin was taken ill, and died July 13, 1380.

GUEUX (ge), or "The Beggars," the name assumed by the confederated nobles who opposed the introduction of the Inquisition into the Low Countries by Philip II. of Spain. Forming themselves into an association, November, 1565, they presented a formal protest to the regent, Margaret of Parma, April 5, 1565. Their distinctive party name they adopted from an abusive epithet applied to them on that occasion by one of Margaret's courtiers. The "beggars," who represented the national feeling of the country, maintained a long and vigorous contest against the despotic proceedings of Philip and his advisers, but were ultimately compelled to succumb to superior force. A branch of them, "the Beggars of the Sea," under the leadership of the bold Count de la Marck, seriously harassed the Spanish fleet, captured transports with supplies for Al-

va's army, seized several fortresses, and succored besieged places along the coast. Their capture of Briel in April, 1572, was the beginning of the war which terminated in the independence of the Netherlands in 1648.

GUIANA (gē-ä'nä), **BRITISH**, a British colony in the N. E. part of South America; bounded by Dutch Guiana, Brazil, Venezuela, and the Atlantic Ocean; area, 89,480 square miles; capital, Georgetown. The surface of the country is diversified with low savannahs near the coast and mountainous toward the S., the highest mountain being Mt. Roraima, 7,500 feet. The chief products are gold, sugar, molasses, balata, rum, and rice. There are railroads, steamship communications with Great Britain and telegraph and telephone systems. Columbus is said to have discovered the Guianas in 1498. The Dutch made settlements in 1650 and the English in 1630. In 1804 the Guianas were divided between the English, French, and Dutch, as they now stand. In 1895 there was trouble between Great Britain and Venezuela, concerning the Guiana boundary. Pop. (1918) 460,000.

GUIANA, DUTCH, or **SURINAM**, a colony of the Netherlands in the N. E. part of South America; bounded by Brazil, British Guiana, French Guiana, and the Atlantic Ocean; area, 46,050 square miles; capital, Paramaribo. The surface is low along the coast, gradually increasing in elevation toward the mountains in the S. The principal products and exports are sugar, cocoa, bananas, coffee, rice, maize, rum, molasses, and gold. There are public schools, savings banks, and steamship lines. In 1667 Dutch Guiana was ceded to the Netherlands by Great Britain in exchange for New Netherlands. It was held by the British in 1799-1802, and again in 1804-1816, when it was returned to the Netherlands with several other Dutch colonies. Pop. (1919) 167,827.

GUICCIARDINI, FRANCESCO (gwē-chär-dē'nē), an Italian historian; born in Florence, March 6, 1482. The combined studies of law and literature engrossed his attention at first; and at the age of 23 he was elected Professor of Law at Florence, where he also practiced as an advocate. His apprenticeship served in Spain (1512-1514), he became papal ruler of Modena and Reggio under Leo X. and Clement VII., and afterward of Parma in 1521, the Romagna in 1523, and Bologna in 1531. Retiring from the service of the Pope in 1534, he was instrumental in securing the election of Cosmo de' Medici as duke of his native city, Florence. But, being disappointed in his ambitious design of acting as mayor of the palace to this young prince, Guicciardini withdrew to Arcetri, and busied himself with the composition of an analytical history of Italy between 1494 and 1532. He died in Arcetri, in May, 1540.

GUIDO ARETINUS (gwē'dō a-ri-tī' nus), or **GUY OF AREZZO** (ä-ret'sō), a French musician; born near Paris in 990; went to Arezzo as a Benedictine monk. He greatly influenced musical studies, and almost every discovery made in music for 150 years has been attributed to him, including that of descant, counterpoint, and the spinet. He is said to have invented the principle on which the construction of the stave is based, and the hexachord, solmisation, and the "Harmonic or Guidonian Hand," a mnemonic method of indicating the order of the musical sounds on the finger-joints of the left hand. Guido left writings explanatory of his musical doctrines, especially the "Micrologus" and the "Antiphonarium." He died in Avellana in 1050.

GUIDO RENI, an Italian painter; born in Calvenzano, Nov. 4, 1575. He studied under Calvaert, and entered the school of the Caracci. His earliest works, of which the "Coronation of the Virgin," in the National Gallery, London, is an example, are marred by rather harsh and violent coloring; but coming under the influence of Caravaggio, he adopted many of the qualities of his art. About 1596 he settled in Rome, where he worked for some 20 years, adopting a graceful style, of which the famous "Aurora and the Hours," painted on the ceiling of the pavilion of the Rospigliosi Palace, is a typical example, as is also the "Nativity," in the choir of San Martino at Naples. He died at Bologna Aug. 18, 1642.

GUIENNE (gē-en'), one of the old French provinces, comprehending the present departments of Gironde, Lot, Dordogne, Aveyron, with portions of Tarn-et-Garonne and Lot-et-Garonne. It formed with Gascony what was originally the country of Aquitania, of which name Guienne is a corruption.

GUILD, a society or body of individuals associated together for carrying on commerce, or some particular trade or business. There existed at Rome various fraternities of tradesmen, which bore a considerable resemblance to our modern guild, and were permitted to

regulate their affairs by their own laws; but it is usual to trace the origin of guilds to the Middle Ages. As soon as the citizens acquired an influence in the administration, the guilds became the basis of the municipal constitutions, and everyone who wished to participate in the municipal government was obliged to become a member of a guild. Guilds introduced the democratic element into society, and in their progress became the bulwarks of the citizen's liberty and the depositaries of much political power. By the close of the 12th century merchants' guilds were general throughout the cities of Europe. The Drapers' Company of Hamburg dates from 1153, and that of the Shoemakers of Magdeburg from 1157. With the increase of their wealth and strength, the guilds either purchased or extorted from their rulers privileges which, once obtained, they were careful never to give up. By the 13th century they had acquired considerable power, and in the course of two successive ages they counterbalanced the power of the nobles.

GUILDFORD (gil'fōrd), a town and county-seat of Surrey, England, in a break of the chalk ridge of the North Downs, on the navigable Wey, 30 miles S. W. of London. Its houses are still rich in quaint gables, projecting fronts, and long latticed windows. The square Norman keep of its royal castle is 70 feet high with walls 10 feet thick; on St. Catherine's Hill is a ruined chapel (1313); Abbot Hospital, founded in 1619 by Archbishop Abbot for 12 brethren and 8 sisters, is a picturesque red brick pile; and other buildings are the churches of St. Nicholas, St. Mary, and the Holy Trinity, the guildhall (1687), county hall (1862), county hospital (1868), and grammar school (1509-1550). Guildford is famous for its grain market, the "Surrey wheats" being celebrated. It was bequeathed in 901 by Alfred the Great to his nephew Ethelwald, and in 1036 was the scene of the decimation by King Harold's men of the Norman followers of Alfred the Atheling, a crime that led up to the Norman conquest of England. The Dauphin Louis took the castle in 1216; and in 1685 Monmouth was temporarily confined in Abbot Hospital. Pop. about 23,000.

GUILDHALL, a building in London, the place of assembly of several courts, and the scene of the civic banquets of the city corporation; originally built in 1411, but almost wholly destroyed by the great fire of 1666. It was rebuilt in 1789 in its modern form.

GUILFORD COLLEGE, a coeducational institution in Guilford, N. C.; founded in 1837 under the auspices of the Society of Friends, reported at the close of 1919: Professors and instructors, 15; students, 177; president, Raymond Binford.

GUILFORD COURT-HOUSE, a village in Guilford co., N. C.; about 5 miles from Greensboro; noted for a battle fought between the Americans under General Greene and the British under Lord Cornwallis, on March 15, 1781. The Americans numbered about 4,400 and the British 2,400. Both armies lost heavily, and the engagement was indecisive.

GUILLOTINE (gi-lo-tēn'), an apparatus for beheading persons at one stroke, adopted by the National Assembly of France during the first revolution, on the proposal of a Dr. Guillotin, after whom it is named. It was made by a German mechanic, named Schmidt, under the direction of Dr. Antoine Louis, secretary of the Academy of Surgery, and was at first called Louison, or Louisette. It was used the first time April 25, 1792, for the execution of a highwayman named Pelletier.

GUINEA (gin'i), the name formerly given a large section of the W. coast of Africa, from the Senegal, in about 14° N. lat., to Cape Negro, in 16° S. lat. It was divided into two parts, Upper and Lower Guinea, the dividing line being taken variously as the equator, the Gaboon, and the Ogoway. The states and political territories comprised within this long stretch of coast-line, commencing from the N., were as follows: the French colony of Senegal, the English settlements on the Gambia, the Portuguese territory of Bissao or Bissajos, the coastal fringe before Futa-Jallon, Sierra Leone, the free negro republic of Liberia, the Ivory and Gold Coasts, the Slave Coast, the Niger delta, and the Kameruns in Upper Guinea; and in Lower Guinea, the Spanish settlements on Corisco Bay, Gaboon, the Kongo Free State, and the Portuguese territories of Ambriz, Angola, and Benguela. The coast-line is throughout tolerably uniform, and everywhere flat, with numerous shallow lagoons separated from the ocean by narrow spits of sand, lying parallel to the coast. Proceeding inland, the country rises to the central plateau of the continent by a series of broad terrace-like steps, down which the longer rivers are generally precipitated in cataracts and rapids. The Genoese claim to have been the first European navigators to reach, in 1291, the coasts of Guinea.

They were, however, first regularly visited by merchant adventurers from Rouen and Dieppe from 1364 onward, but not colonized till the end of the 15th century, when the Portuguese, under the enterprising Prince Henry the Navigator, sent out, in 1481, the first colonies to this part of the world.

GUINEA FOWL, a genus of African birds in the pheasant family. The plumage is dark gray, with round spots of white, generally larger on the back and under the surface. Some species are adorned on the head with a helmet or horny casque, while others have fleshy wattles on the cheeks and a tuft or top-knot on the crown. The genus is represented by nine species, in the Ethiopian region—E. to Madagascar, S. to Natal. The best known is the common guinea fowl or pintado (*N. meleagris*), also popularly known as "Come-back," from its cry, with naked head, and slate-colored plumage, everywhere speckled with round white spots of various sizes. It is common in Guinea and S. to the Cape of Good Hope. It is found also in more N. parts of Africa, and was known to the ancient Romans, by whom it was called Meleagris and Gallina Numidica, and highly prized. In their wild state the birds occur in flocks, sometimes of 50 to 60. They are not so polygamous as many of the gallinaceous birds, and even in domestication show a tendency to pair. The guinea fowl is now common in the poultry yards of most parts of the world.

GUINEA, GULF OF, that portion of the Atlantic which washes the shores of Upper Guinea, between Cape Palmas and Cape Lopez, and including the bights of Bein and Biafra. The islands of Fernando Po, Prince's, and St. Thomas are within this gulf.

GUINEA PIG, the common name of the genus *Cavia*, family *Hystricidæ*. The common guinea pig, *C. cobaia*, is indigenous to South America, but is now found domesticated in all parts of the world. It has ears large and broad, the upper lip divided in two, the hair or fur erect, and somewhat resembling that of a pig. Its color is generally white, with black spots, although this is somewhat variegated by orange blotches on the coat. It has five toes on the fore legs, and three on the hind ones and has no tail. In their habits guinea pigs are extremely neat.

GUINEGATE (gēn-gät'), a village of Hainault, Belgium; the scene of two French defeats. On Aug. 17, 1479, they were beaten by Maximilian I. of Austria; and on Aug. 16, 1513, by Henry VIII. and the Emperor Maximilian. This battle was called the Battle of the Spurs, the French knights having made more use of their spurs than of their swords.

GUINES (gēn), formerly **GUISNES**, a small town in France, 8 miles S. of Calais; the scene of "the Field of the Cloth of Gold."

GUINEY, LOUISE IMOGEN (gī' ni), an American poet; born in Boston, Jan. 7, 1861. Among her volumes of verse may be mentioned: "Verse"; "Songs at the Start"; "A Roadside Harp"; "Martyr's Idyl"; etc. She has also published: "Goose-Quill Papers"; "Brownies and Bogles"; "Monsieur Henri"; "A Little English Gallery"; "Lovers' Saint Ruths"; "Patrins"; "The Secret of Fougereuse"; "Hurrell Froude" (1904) "The Blessed Edmund Campion" (1908), etc. She died in 1920.

GUISBOROUGH (giz'bur-ō), a town of the North Riding of Yorkshire, England, at the foot of the Cleveland Hills, in the midst of the iron mining district, 9 miles E. S. E. of Middlesborough. The earliest alum works in England were established here about the year 1600. Here too are the remains of a priory built in 1119 by Robert de Brus, and at the time of the Reformation one of the wealthiest monastic institutions in the kingdom.

GUISCARD, ROBERT (gēs-kär'), Duke of Apulia and Calabria; born near Coutances, Normandy, about 1015; won great renown in south Italy as a soldier, and after the death of William and Humphrey was proclaimed Count of Apulia. Guiscard next captured Reggio and Cosenza (1060), and thus conquered Calabria, in the possession of which he was confirmed by Pope Nicholas II. Robert now became the Pope's champion, and along with his younger brother Roger waged incessant war against Greeks and Saracens in south Italy and Sicily, both of which gradually fell under their arms, the latter being, however, given to Roger as count. The closing years of his life were occupied in fighting against Alexius Comnenus, who had deposed Michael VII. from the throne of Constantinople. He died in Cephalonia, July 17, 1085.

GUISE (güez), a town of the department of Aisne, France, on the Oise, 25 miles E. N. E. of St. Quentin. Within the town are the ruins of a castle, from which the famous Dukes of Guise derived their title. The iron works are

conducted on a profit-sharing scheme; and the workmen are provided with dwellings on the associated plan. This "Familistère," of which the first portion was erected by the initiator of the experiment, M. Godin, in 1859-1860, cost about $400,000, and provides accommodation for 2,000 persons. Within the buildings are a café, theater, nursery, schools, covered playgrounds, co-operative store, and a library and reading room. The town was occupied by German forces in 1914 in their drive on Paris.

GUISE, the name of a branch of the ducal family of Lorraine, which it derives from the town of Guise, in the department of Aisne.

CLAUDE OF LORRAINE, first Duke of Guise, fifth son of René II., Duke of Lorraine; born at the château of Condé, Oct. 20, 1496. Attaching himself to Francis I., he fought with distinction at Marignano in 1516; but after that campaign remained at home to defend France against the English and Germans (1522-1523). During the captivity of Francis I., after Pavia, Claude of Guise suppressed the peasant revolt in Lorraine (1527), for which Francis, after his return home, created him Duke of Guise. He died April 12, 1550.

His daughter, MARY OF LORRAINE, born Nov. 22, 1515; in 1538 became the wife of James V. of Scotland. By his death in 1542 she was left a widow with one child, Mary, Queen of Scots. Under the regency of Arran which followed, war broke out between England and Scotland, partly on account of the claims which Henry VIII. made with regard to the infant Mary's marriage, and partly on religious grounds. Mary of Lorraine during those years acted with much wisdom and moderation; but after her own accession to the regency in 1554, she allowed the Guises too much to influence her policy, the result being that the Protestant nobles combined against her in 1559. This rebellion, which she was assisted by French troops to repress, continued almost to the time of her death, which took place in Edinburgh Castle, June 10, 1560.

FRANCIS, second Duke of Guise, son of the first duke; born in Bar, Feb. 17, 1519; became one of the greatest generals of France. At the siege of Boulogne in 1545 he gained the nickname of Balafré from a severe wound in his face. Seven years later he held Metz gloriously against Charles V. of Germany and thus prevented an invasion of France. He added to his reputation at Renti in 1554, fighting against the troops of Charles V., and in 1556 took command of the expedition against Naples. Recalled in the following year to defend the N. frontier against the English, he took Calais in 1558 and other towns, and brought about the treaty of Château Cambrésis in 1559. He and his brother Charles, the cardinal, probably the most capable man of the Guises, who afterward played a prominent part at the Council of Trent, then managed to possess themselves of all real power during the reign of the weak King Francis II. Putting themselves at the head of the Roman Catholic opposition to the Reformation, they repressed Protestantism with a strong arm. In the war between Huguenots and Catholics Guise and Montmorency won a victory at Dreux in 1562, and the former was besieging Orleans when he was assassinated by a Huguenot nobleman, on Feb. 18, 1563.

HENRY I., third Duke of Guise, son of Francis; born December 31, 1550. Filled by the murder of his father with bitter hatred of the Protestants, he fought fiercely against them, at Jarnac in March, 1569, and Moncontour in October, 1569, and in the same year forced Coligny to raise the siege of Poitiers. He was one of the contrivers of the massacre of St. Bartholomew, August 24, 1572, in which he personally made sure that Coligny should be slain; and subsequently he put himself at the head of the Catholic League. He had, however, a greater ambition, that of succeeding to the throne of France, for in respect of real power he was already the equal, or rather the superior, of the feeble King Henry III., whose commands he set at naught and whom he so deeply humiliated that the king procured his assassination at Blois, Dec. 23, 1588.

HENRY II., fifth Duke of Guise, grandson of Henry I.; born in Blois, April 4, 1614. He was destined for the Church, and at the age of 15 became Archbishop of Rheims, but in 1640, on the death of his elder brother, he succeeded to the dukedom. Having joined the league against Richelieu, he was condemned by the parliament of Paris to capital punishment, but found refuge in Flanders. He put himself at the head of Masaniello's revolt in Naples as the representative of the Anjou family, but was taken prisoner by the Spanish forces in 1647, and carried to Madrid, where he remained five years. After another fruitless attempt to win Naples in 1654, he settled at Paris and lived the life of a courtier. He died in Paris, June 2, 1664.

GUITAR (gi-tär'), a musical stringed instrument, somewhat like the lute, particularly well adapted for accompany-

ing the human voice, and much esteemed in Spain and Italy. It was first introduced into the former country from the East by the Moors. It has six strings, and the sound is produced by the fingers of the right hand twitching the strings, while the fingers of the left hand make the notes of the music on the finger-board, which has frets across it. The three highest strings of the guitar are always of gut, and the three lowest are of silk spun over with silvered wire. The greatest virtuosi on the guitar have been Giuliani, Sor, Zocchi, Stoll, and Horetzsky.

GUITEAU, CHARLES JULIUS (gē-tō'), an American assassin; born about 1840; became a lawyer in Chicago. In 1880, after the election of James A. Garfield to the presidency, Guiteau went to Washington presumably to secure the office of United States consul at Marseilles, but did not succeed. Owing to this failure and the fact that the new President was opposed to the "Stalwarts," led by Roscoe Conkling, Guiteau became greatly incensed. On July 2, 1881, he shot the President in the waiting room of the Baltimore and Potomac Railroad station in Washington; and on Sept. 19 the President died from the effect of his wound. Letters taken from Guiteau after his arrest showed that he had planned to "remove" the President. He was indicted for murder on Oct. 7, was found guilty after trial on Jan. 25, 1882; and was hanged in the District of Columbia jail, June 30, following.

GUITRY, LUCIEN. A French actor. He was born in Paris in 1860, and after receiving his education in the Paris schools, went on the stage and had considerable success from the beginning. An opportunity offering for work in Russia he went there and spent nine years at the Théâtre Michael, Petrograd. The rôles in which he has won success are numerous, the most noted being in "L'Assommoir," "La Veine," "L'Adversaire," "Le Mannequin-d'osier," "La Griffe," "Le Voleur," "Sampson," "L'Emigré," "Chantecle." He is Manager of Porte St. Martin and Director of the Renaissance Theatre.

GUIZOT, FRANÇOIS-PIERRE-GUILLAUME (gē-zō'), a French historian; born in Nîmes, Oct. 4, 1787; educated at the gymnasium of Geneva, Switzerland. In 1805 he commenced legal studies at Paris, but gradually drifted into the literary profession. In 1812 he married Mlle. de Meulan, editor of the "Publiciste," and became Professor of History at the Sorbonne. On the fall of the empire he obtained several public offices, such as councillor of state, and director-general of the department and communal administration. In 1816 he published "The Representative Government, and the Real Condition of France" and "An Essay on Public Instruction." In 1820 the Duc de Barry was assassinated, and Guizot's party fell before an ultra-royalist reaction. In 1825 he was deprived of his chair on account of the political character of his lectures, but it was restored to him in 1828. In 1829 he again became councillor of state, and in 1830 was elected deputy for the arrondissement of Lisieux. After the July revolution he was appointed minister of the interior, but resigned in 1831. After the death of Périer, Guizot, along with Thiers and De Broglie, formed a coalition ministry, and he rendered great service as minister of public instruction. He became ambassador at the British court in 1840, and next year he became the real head of the government of which Soult was the nominal chief. He retained the office of minister of foreign affairs until 1848, and during that period opposed all measures of reform. After the fall of Louis Philippe, Guizot escaped and fled to England. Henceforth he practically retired from public life. Among his numerous works may be mentioned: "History of Civilization in France"; "General History of Civilization in Europe"; "History of the English Revolution"; "Meditations and Moral Studies"; "Memoirs in Regard to the History of My Time"; "Meditations on the Actual State of the Christian Religion"; "Biographical and Literary Miscellanies"; "History of France, told by My Small Children"; "William the Conqueror"; and "Washington." He died in Val-Richer, France, Oct. 12, 1874.

GUJARAT (guzh-rät'), or **GUZERAT,** the chief town of Gujarat district, in the Punjab, India; a few miles N. of the present bed of the Chenab; is a place of some military and political importance, as well as the center of a considerable trade. Here, in 1849, a decisive battle was fought, which finally broke the Sikh power, and brought the whole Punjab under British rule.

GUJRANWALA (guzh-ran-wä'lä), chief town of Gujranwala district in the Punjab, India; 40 miles N. of Lahore. It was for a time the capital of the Sikh power, and Ranjit Singh was born here.

GULDEN (göld'en), a silver coin of Austria-Hungary and also of Holland, worth about 40 cents; also called a florin.

GULF OF ST. LAWRENCE, a W. inlet of the North Atlantic Ocean, touching

all the British provinces of North America, Newfoundland, Canada, New Brunswick, Nova Scotia, and Prince Edward Island. It has three communications with the ocean, the Strait of Belle Isle, between Newfoundland and Labrador; the Gulf of Canso, between the island of Cape Breton and the peninsula of Nova Scotia; and a far wider passage than either, with the island of St. Paul in the middle, between Cape Breton and Newfoundland; while in the opposite direction it narrows, at the W. end of Anticosti, into the estuary of the St. Lawrence river.

GULFPORT, a city of Mississippi, the county-seat of Harrison co. It is on the Mississippi Sound and on the Louisville and Nashville and the Gulf and Ship Island railroads. The city is a port of entry and has an excellent harbor, accessible to large vessels. It has an important trade in lumber, naval stores, cotton, etc. Its industries include fertilizer works, canning factories, and saw mills. Among the notable buildings are a United States custom house, Gulf Coast Military Academy, and a post office building. Pop. (1910) 6,386; (1920) 8,157.

GULF STREAM, a well-defined current in the Atlantic Ocean. As all ocean currents are so continuous as to be really but one current connected at the two ends, so that the movement of one part is the movement of all, the Gulf stream cannot strictly be said to begin anywhere. It is due to the reflux of the equatorial current. The condensation and superheating of the last-named current takes place mainly in the Caribbean Sea and the Gulf of Mexico, whence arises the name Gulf stream. Its temperature there is about 50°. It emerges as a defined hot current through the Straits of Florida, and courses in a N. E. direction at a little distance from the coast of the United States, so affecting the Bermudas as to make their climate semi-tropical. Between these islands and Halifax the Gulf stream is about 60 miles broad, 100 fathoms deep, and moves at the rate of 3 knots an hour. It is of a deep blue color, in marked contrast to the dull green of the Arctic reflux. The Gulf stream moves in a N. E. direction toward Europe. It is generally believed to be through its influence that the W. coast of the European continent is so much milder than the corresponding latitudes of America.

GULL, the English name of *Larus*, a genus of natatorial birds. They are widely distributed along the shores of the several seas and oceans, feeding voraciously on fish. They breed on rocky headlands, making a rude nest in which they lay from two to four eggs. Many of the species are migratory, and all are powerful of wing, which enables them to fly against a storm. They are slaughtered by thousands to provide plumes for ladies' hats. The flesh of the gull is rank and coarse, but that of the young birds is salted for winter use on many N. coasts. The eggs are much sought after for food. Gulls: (1) The sub-family *Larinæ*, one of three into which the family *Laridæ* is divided. It contains the genus *Lestris* (*Skua*), in addition to the gulls proper. (2) The family *Laridæ*. It comprehends not only the gulls, but the terns, petrels, etc.

GUM, in anatomy, the soft covering of the dental arches. The gums consist of a dense connective tissue, covered by a scaly and stratified epithelium.

GUM, a vegetable secretion, sometimes occurring in intercellular spaces, formed by the separation of the walls of cells; it is viscid, but not oily. The most typical kind of gum is GUM ARABIC (*q. v.*). In pharmacy gum is used as a demulcent to allay the irritation of the mucous membrane, also for suspending heavy powders, when they are given in a liquid. The word is sometimes used synonymously with the term gumming. Gum from the spruce tree is extensively used as a confection and as a chewing-gum. Doctor's gum is said to be furnished by *Rhus metopium*, a Jamaica plant, to which, as well as to some other plants, Hog gum has been attributed.

GUM ARABIC, a gum obtained from the *Acacia arabica*, which grows abundantly in India and Arabia. It is yielded also by *A. speciosa* in India, *A. nilotica* and *A. seyal* in Arabia, *A. tortilis* and *A. ehrenbergiana* in tropical Africa, *A. mollissima* and *affinis* supply a similar gum in Australia. Gum arabic can be obtained also from *Vachellia farnesiana* of India, a small tree closely allied to the true acacias; a gum akin to it is derived from *Terminalia belerica*, a Myrobalan. Gum arabic occurs in transparent white tears, which are often colored yellow or brown by impurities. It dissolves in water, and the solution gives a precipitate of arabin on the addition of hydrochloric acid. Gum arabic contains about 70 per cent. of arabin, $2C_6H_{10}O_5+H_2O$, and 17 per cent. of water; the rest consists of potash and lime, which were combined with the arabin. Gum is insoluble in alcohol. By the action of nitric acid it is converted into mucic, saccharic, and oxalic acids.

GUMMERE, FRANCIS BARTON (gum'e-rē), an American teacher and author; born in Burlington, N. J., March 6, 1855. He was instructor in Harvard College from 1881 to 1882; and in 1887 became Professor of English at Haverford College, Pa. Besides miscellaneous papers in Germanic philology and English literature, he has written: "The Anglo-Saxon Metaphor" (1881); "Handbook of Poetics" (1885); "Germanic Origins" (1892); "Old English Ballads" (1904); "The Popular Ballad" (1907).

GUN. See AUTOMATIC GUN; FIREARMS; ORDNANCE; ARTILLERY; MACHINE GUN; EXPLOSIVES.

GUN BATTERY, in fortification, the emplacement of two or more pieces of artillery, destined to act on the offensive or defensive. It may be: En echarpe, having a line of fire oblique with the object. En revers, playing on the rear of the enemy. Crossfire, several batteries having a converging fire on an object. Casemate, when protected by a bomb-proof chamber, and firing from embrasures. Barbette, firing over a parapet. Ricochet (smooth bores only), when the balls, with a low charge, traverse the inner face of the enemy's work, and rebound and roll along the same. Mountain, light pieces adapted to be dismounted and, with their dislocated carriages, carried on mules. Some of these have been made in two pieces, which unscrew for ease in transport. In field-artillery, the tactical unit of field-artillery, consisting of six or eight field guns under one command, together with the officers, men, horses, wagons, and stores.

GUN COTTON, pyroxylin. Trinitrocellulose, $C_6H_7(NO_2)_3O_5$, more probably a nitric ether of cellulose, $C_{12}H_{14}(ONO_2)_6O_4$, as by the action of reducing agents as hydric potassium sulphide, KHS, and iron and acetic acid, it is converted into cellulose. Boiled with ferrous sulphate and concentrated hydrochloric acid, it gives off all its nitrogen as N_2O_2. Gun cotton was discovered by Schönbein in 1845. It is prepared by drying cotton-wool at 100° and then leaving it for 24 hours in a mixture of one volume of nitric acid, specific gravity 1.5, and three volumes of sulphuric acid, specific gravity 1.85, the mixture being cooled to 10°. It is then washed with water, and, if required pure, again with a mixture of one part alcohol and three parts ether to remove the lower nitrates. Gun cotton finely divided explodes between 160°-170°. It keeps best if it is washed with soda. Compressed gun cotton burns like tinder, but is exploded by mercuric-fulminate. See EXPLOSIVES.

GUNNERY, See GUN POWDER, ARTILLERY, MACHINE GUN, RIFLE, ETC.

GUNNISON, a river in Colorado, a tributary of the Grand river, and which passes through a remarkable cañon 15 miles in length.

GUN POWDER, like many other so-called "modern inventions," gun powder appears to have been known to the Chinese several centuries before its invention in Europe, whether we ascribe the invention to Roger Bacon in the 13th century or to Friar Schwartz in the 14th. Its earliest well-authenticated use in warfare was at the battle of Crecy in 1346. Its use was rapidly extended and within a century after Crecy it had driven the bow and arrow from the field and relegated the lance and the battle axe to the secondary position of weapons for special emergencies only.

It is rather surprising that for more than five centuries, the ingredients first used remained unchanged. These were saltpeter, charcoal and sulphur;—charcoal to furnish the fuel for burning, saltpeter to furnish the oxygen needed to combine with the carbon of the charcoal, and sulphur to accelerate the rate of burning. The products of combustion are carbon dioxide and nitrogen, both gases, and the sulphate and carbonate of potassium, both solids. The expansive force of the gases is due not alone to the change from the solid to the gaseous state, but to the further expansion from the heat released by the change. The solids, being finely divided, produce the dense smoke which marks the firing of a gun loaded with what is now commonly called "black powder" as distinguished from the more modern smokeless powder.

Not every explosive substance is suitable for use as a "propellant" in a gun. To be available for such use, not only must the explosive develop great power but it must develop this power gradually, so that the projectile shall be started from its seat slowly and driven down the bore more and more rapidly as the pressure behind it rises to a maximum. If the full pressure were developed instantaneously, the gun would be ruptured before the projectile was started from its seat. Here we touch upon the difference between "explosion" and "detonation." The explosion of a charge of powder in a gun, sudden as it is, is slow compared with the detonation of the "high explosives," nitro-glycerine, gun-cotton, etc. In one case we have an actual burning, the flame of which passes from grain to grain of the powder, occupying an interval which is perfectly appreciable and can be measured. In the other case we have a

shattering of the chemical structure and a re-arrangement of the atoms in a new structure, which is as nearly instantaneous as any process known to nature.

It has been stated that for several centuries after the introduction of gun powder, its composition remained practically unchanged. This does not mean that no improvements were made. There are several factors besides the nature of the ingredients of the powder which influence its behavior. Of these, the most important are the size, shape and density of the grains. A large grain burns more slowly than a small one, and a dense grain more slowly than a light one. And slow burning means less violence of explosion and more gradual and progressive development of pressure. The rate of burning is still further affected by the shape of the grain—a grain which exposes a large surface to ignition burning more rapidly than one of smaller surface. Taking advantage of these facts, artillerists designed many forms of powder grains of varying degrees of effectiveness, but hampered always by the limitations of expansive power inherent in the chemical composition of black powder. It was early recognized that certain of the high explosives would be ideal for gun powders if they could be tamed into the slow and regular burning needed for a propellant. It was realized not only that their power was enormously in excess of the maximum to be hoped for from black powder, but that, as the products of their combustion were entirely gaseous, a powder made from them would be practically smokeless. Many plans were tried for bringing them under control, but the problem was not solved until, toward the end of the last century, the French chemist and artillerist Vielle discovered that the burning of gun-cotton could be perfectly controlled by making it into a colloid. A colloid is a hard, horn-like substance, entirely homogeneous, and free from the cellular structure which, in simple gun-cotton, allows the flame of ignition to flash instantaneously throughout the mass. Singularly enough, it was found that one of the substances in which gun-cotton could be dissolved for colloiding was another of the most violent of high explosives, nitro-glycerine. When these two extremely sensitive and tremendously powerful explosives are treated together by suitable processes, their combined power is preserved but their sensitiveness almost completely eliminated. The resultant substance is the well-known British "Cordite", one of the most efficient of the modern smokeless powders. Another of the substances having the power of colloiding gun-cotton is acetone, used in American and French smokeless powders. As has been already stated, none of these powders are absolutely smokeless, but such smoke as they produce is largely water-vapor, which dissipates quickly. The point should be emphasized, however, that smokelessness is a matter of altogether secondary importance, the real value of gun-cotton powders lying in their power, which is enormously greater than that of black powder, and in the facility with which they lend themselves to variations of size and shape suitable for guns of various calibers. This point is forcibly brought out in the variegated shapes and sizes of smokeless powders used in the United States Army and Navy. See EXPLOSIVES.

GUNPOWDER PLOT, a plot, formed in England about A. D. 1604, by Robert Catesby, various Roman Catholics of rank, goaded into excitement by the penal laws directed against their faith and its professors, joining as accomplices. Their aim was to blow up the House of Parliament by gunpowder Nov. 5, 1605, and destroy king, lords, and commons by one blow. An anonymous letter of mysterious warning, sent to Lord Monteagle, having led to the discovery of the plot, various conspirators were executed Jan. 30 and 31, 1606, and one May 3 following. Among those put to death was Guy Fawkes, who had been caught in the vault below the House of Lords with matches and touchwood on his person ready to fire the train. Since 1605 all places connected with the House of Lords and Commons where explosives could be stowed away are annually searched at the opening of Parliament.

GÜNS, a town of Hungary, on the Güns, 20 miles S. of Oedenburg. This town was the first that successfully resisted Solyman the Magnificent, when in 1532 that monarch threatened to conquer all Europe.

GUNTER, ARCHIBALD CLAVERING, an American author; born in Liverpool, England, Oct. 25, 1847. When five years old he was taken to California by his parents. He was a mining and civil engineer in the West from 1867 until 1874, when he became a stock broker. In 1877 he removed to New York, where he devoted himself to writing plays and novels. The best known of the former are: "Prince Karl"; and "The Deacon's Daughter." His most popular novels are: "Mr. Barnes of New York" (1887); and "Mr. Potter of Texas" (1888): both successfully dramatized; "That Frenchman" (1889); "Miss Nobody of Nowhere" (1890); "Baron Mon-

tez of Panama and Paris" (1893); "A Florida Enchantment" and "The Man Behind the Door" (1904). He died Feb. 23, 1907.

GUNTOWN, a village in Lee co., Miss.; where on June 10, 1864, a National force of 12,000 men, commanded by General Sturgis, was utterly routed by the Confederates, under General Forrest, losing about 3,500 men, and everything except arms.

GURGES, or **GORGES**, in heraldry, a charge meant to represent a whirlpool. It takes up the whole field; and when borne properly, is azure and argent.

GURNEY, JOSEPH JOHN, an English philanthropist; born in Earlham Hall, England, Aug. 2, 1788; became a Quaker clergyman. He was very active in prison reform, and was closely identified with Wilberforce and Clarkson in the anti-slavery movement. He was the author of "Notes on Prison Dicipline" (1819); "Evidences, Etc., of Christianity" (1827); etc. He died in Earlham, England, Jan. 4, 1847.

GUSSET, in engineering, an angular piece of iron inserted in a boiler tank, etc., where it changes from a cylindrical to a square form, etc., as in the junction of the barrel and fire box of a locomotive.

GUSTAVUS I., commonly called "Gustavus Vasa," King of Sweden; born in Lindholm, May 12, 1496. He was the son of Eric Johansson, a Swedish noble, served under Svante Sture, the administrator of the kingdom, was treacherously carried off with other noble Swedes by the King of Denmark, and kept a prisoner in Jutland for more than a year, but at length escaped, reached, after many dangers, Dalecarlia, where he roused the peasants to resist Danish oppression, defeated the Danes, took Upsala and other towns, and in 1523 was elected king. In 1529 he procured the abolition of the Roman Catholic religion in Sweden, and established Protestantism. During his long reign Sweden made great progress in commerce and civilization. He died in Stockholm, Sept. 29, 1560.

GUSTAVUS II., GUSTAVUS ADOLPHUS, King of Sweden, a grandson of Gustavus Vasa; born in Stockholm, Dec. 9, 1594; and received a careful education. He was trained to war under experienced generals, took his place in the state councils at the age of 16, and was in command of the army in his 17th year during the war with Denmark, which was concluded in 1613, and by which Sweden recovered important possessions on the Baltic. He then turned his arms against the Russians, drove them from Ingria, Karelia, and a part of Livonia, which were secured to him by the peace of Stolbova in 1617. He was then engaged in a war with Poland, which lasted nine years, and was concluded on advantageous terms for Gustavus in September, 1629, he being allowed to retain important conquests in East Prussia. His attention was now diverted from N. wars by the affairs of Germany. He embarked for Germany in 1630 with about 20,000 men, landed near the mouth of the Oder, and in a short time had seized nearly all Pomerania. After taking many fortified towns, repeatedly defeating the imperial generals at Leipsic and Würzburg in 1631, Passage of the Lech in 1632, and conquering a great part of Germany, he was killed in the battle of Lützen, against Wallenstein, Nov. 16, 1632.

GUSTAVUS III., King of Sweden, born in Stockholm, Jan. 24, 1746; succeeded his father, Adolphus Frederick, in 1771. Finding the country weary of the misrule of the nobles, he gained the good-will of the army, surrounded the assembly of the states-general, and forced them to accept a new constitution which much restricted their privileges. In 1788 he took command of the army against Russia and Denmark, and stormed the defenses of Frederikshald, destroying a great number of vessels. In 1789 he executed another coup d'état, arresting the opposition leaders, and passing a law extending the royal prerogative. On the outbreak of the French revolution he made strenuous exertions to form a coalition between Russia, Denmark, Sweden, and Spain, but while preparations were making a conspiracy of the nobles was formed against him, and he was shot at a masquerade by Ankarstroem, a disbanded officer, March 16, 1792. He died March 29, 1792.

GUSTAVUS IV., ADOLPHUS, King of Sweden, born in Stockholm, Nov. 1, 1778; and succeeded his father, March 29, 1792. On assuming power Gustavus showed that he had inherited his father's hatred of the principles of the French Revolution, which he carried to the extent of fanaticism. After the Peace of Tilsit he exposed himself to a war with Russia while he was at war with France by refusing to join the continental blockade and opening his ports to England; and in 1808 he quarreled with England, his only ally. Finland was lost to Sweden, and in 1809 a revolution took place. Gustavus was dethroned, and his

uncle, the Duke of Sudermania, proclaimed king under the title of Charles XIII. Gustavus died in St. Gall, Feb. 7, 1837.

GUSTAVUS V. (GUSTAVUS ADOLPHUS), King of Sweden; born in 1858. He was the son of Oscar II. and Queen Sofia Wilhelmina. After completing his education, he entered the army in 1875 and in 1892 became lieutenant general. He married in 1881 Victoria, the daughter of the Grand Duke of Baden. He acted as regent during his father's absence, in 1899 and 1900. In December, 1907, following the death of his father, he succeeded to the throne.

GUSTAVUS ADOLPHUS COLLEGE, a coeducational institution in St. Peter, Minn.; founded in 1862 under the auspices of the Lutheran Church; reported at the close of 1919: Professors and instructors, 25; students, 361.

GUTENBERG, JOHANNES, or **HENNE** (gö'ten-berg), a German printer; born in Mainz, about 1400. In 1434 he was living in Strassburg, and seems to have been well known as a man of considerable mechanical skill, who taught stone cutting, mirror polishing, and similar arts. When and where he made his first attempts in the art of printing cannot with certainty be ascertained. Some time between 1444 and 1448 he returned to Mainz, where, in 1449 or 1450, he entered into partnership with Johannes Fust or Faust, a wealthy goldsmith, who furnished the money required to set up a printing press. This partnership was, however, dissolved after the lapse of a few years, Fust bringing an action at law against Gutenberg to recover the sums he had advanced. In consequence of the legal verdict, Fust retained the printing concern, and carried it on in conjunction with Peter Schöffer of Gernsheim. Gutenberg, with the assistance of a Dr. Homery, afterward set up another printing press. He is considered the inventor of movable type. He died in Mainz, Feb. 24, 1468.

GUTHRIE (guth'ri), a city, until 1911 State capital of Oklahoma, and county-seat of Logan co.; on the Cottonwood river and the Atchison, Topeka, and Santa Fe Railroad. It contains St. Joseph's Academy, a high school, several denominational schools, waterworks, electric lights, 2 National banks, cotton gins, flour and planing mills, furniture and carriage factories, etc. Pop. (1910) 11,654; (1920) 11,757.

GUTHRIE, THOMAS, a Scottish clergyman; born in Brechin, Forfarshire, July 5, 1803; educated at the University of Edinburgh, and was licensed as a preacher in connection with the Church of Scotland in 1825. For some time he was employed in his father's banking office. In 1830 he was presented to the parish of Arbirlot, and he accepted a call to Greyfriars, Edinburgh, in 1837. In 1843 the Disruption took place, and Guthrie took an active part with Chalmers and Candlish in organizing the Free Church. He himself became minister of Free St. John's, Edinburgh. The work with which his name is chiefly identified in Scotland was the introduction into Edinburgh of the ragged school system. His "Plea for Ragged Schools" (1847) is one of the most celebrated of his productions. He became editor of the "Sunday Magazine" in 1864. His chief works are, "The Gospel in Ezekiel" (1855); "A Plea for Drunkards" (1856); "Christ and the Inheritance of the Saints" (1858); etc. He died in St. Leonard's, Feb. 24, 1873.

GUTHRIE, THOMAS ANSTEY, pseudonym F. Anstey, an English humorist.

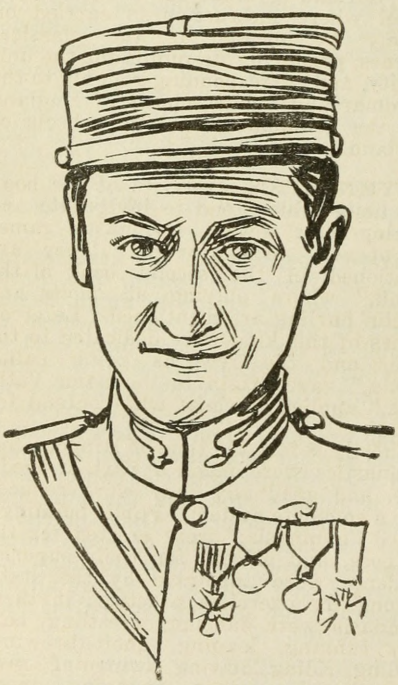
GUTIERREZ, ANTONIO GARCIA (gö-tē-ēr'reth), a Spanish dramatist; born in Chiclana, Cadiz, in 1812. He gave up medicine for the profession of letters; living at first in great destitution, until the play "El Trovador" made him famous and immensely popular. He visited the United States in 1844. Later he became a theatrical manager in Madrid, writing "The Campaign of Huesca," "The Page," and other noble tragedies. He died in Madrid, Aug. 26, 1884.

GUTTA-PERCHA, the inspissated juice of *Isonandra gutta*, the gutta-percha tree. It occurs in tough, flexible pieces of light-brown color, which are soluble in benzene, chloroform, and bisulphide of carbon, insoluble in water, and only slightly soluble in alcohol and ether. The raw gutta-percha comes in lumps weighing from five to six pounds. These are cut into slices, torn to shreds, and then thrown into cold water, when the impurities sink and the pure gum rises to the surface. Gutta-percha is used for making soles of boots impervious to water, for door handles, ear trumpets, golf balls, etc. Above all it is employed for coating submarine telegraph wires.

GUTTENBERG, a town of New Jersey, in Hudson co. It is on the Hudson river. Its chief industry is the quarrying of stone. It has also a lard-refining and a button factory. Pop. (1910) 5,647; (1920) 6,726.

GUY, THOMAS, an English philanthropist; founder of Guy's Hospital, Southwark, London; born in London, in 1644. He began business in 1668 as a bookseller, dealing extensively in the importation of English Bibles from Holland, and, on this being stopped, he contracted with the University of Oxford for the privilege of printing Bibles. By this means, and by selling out his original shares in South Sea stock at a great advantage, he amassed a fortune of nearly £500,000. In 1707 he built and furnished three wards of St. Thomas' Hospital. For the building and endowment of the hospital in Southwark which bears his name he set apart over $1,000,000. He built and endowed almshouses and a library at Tamworth, for which he became one of the members about 1694. Besides bestowing $2,000 a year on Christ's Hospital, and giving to various other charities, he left $400,000 to be divided among those who could prove any degree of relationship to him. He died Dec. 27, 1724.

GUYNEMER, GEORGES, a French aviator. During the World War he was recognized as France's most famous aviator, and rose to the rank of captain before he died. It was declared that in the course of his flying career he had downed 52 enemy machines. He was accustomed to operate his aeroplane alone, piloting it and using the gun at the same time. He was killed Sept. 11, 1917, while flying over Flanders, having met in combat five machines of the Albatross type, other machines descending suddenly upon him. He is declared to have been surrounded by something above 40 machines at the time of his death.



CAPTAIN GEORGES GUYNEMER

GUY OF WARWICK, the hero of one of the most ancient and popular of early English metrical romances. It is a purely English story of the 13th century, related to the Dano-Saxon romance of "Havelok" by its allusions to Danish wars in England, and to the French "King Horn" by its adoption of some of the more striking incidents in that story. Its authorship may be due to Walter of Exeter, a 13th-century Franciscan monk, but it has undoubtedly been improved by some French or Norman minstrel. The story has close affinity with that of Guido Tyrius in the "Gesta Romanorum." The hero, Sir Guy of Warwick, is son of Segard, steward of Rohand, Earl of Warwick; his instructor in the exercises of chivalry, the famous Hérand of Ardenne. Having fallen deeply in love with Felice, the daughter of the earl, he was promised her hand when he earned it by knightly deeds. In the tournament at Rouen he vanquished every competitor and was equally successful in Spain and Lombardy. In England he overcame the famous Dun Cow, but his haughty mistress was still unsatisfied. He went to Constantinople to save the Emperor Ernis from the Saracens, slew the mighty Coldran, and scattered his huge army. The grateful emperor pressed on him the hand of his lovely daughter and heiress Loret, but, faithful to Felice, Sir Guy tore himself away, and returned to his native country, when he heard of a dragon ravaging Northumberland. He hastened to meet the monster, slew him, and carried his head to King Athelstan, at Lincoln. The fair Felice had now no scruple to marry the hero. But remorse for all the slaughter he had done merely for a woman's love began to seize him, and after 40 brief days of wedded happiness he left his home in the dress of a palmer to visit the Holy Land. Here he rescued Earl Jonas from his dungeon, and slew the ferocious giant Amiraunt, after which he returned to England to find Athelstan besieged in Winchester by the Danish Anlaf, of whose army the mainstay was the terrible Colbrand. Sir Guy, still in his disguise, after a prolonged and awful struggle, succeeded in

striking off the champion's head. He now visited his wife all unknown in his palmer's weeds, and then retired to a hermitage at the place still called Guy's Cliff, near Warwick. Before his death he sent her parting ring as a token to Felice, and she arrived in time to close his eyes, survived him for but 15 days, and was buried in the same grave.

GVOSDEVI (gvos-dā'vē), a group of islands in Bering Strait, between North America and Asia, lat. 65° 40′ N., lon. 173° 50′ E. Imaglin, the largest, is 25 miles in length. They are low and destitute of vegetation.

GWALIOR (gwä'lē-ôr), a native state of central India, the dominions of the Mahratta Maharajah Sindhia; area, 25,041 square miles; pop. about 3,100,000. Lying partly in the basin of the Jumna and partly in that of the Nerbudda, it divides its drainage between the bay of Bengal and the Arabian Sea. The principal export is opium. Since 1803 the country has been under British protection. In 1843 the British were compelled, on the death of the sovereign, to send an armed force, which, after severe fighting, succeeded in restoring his adopted successor to the throne; and during the troubles of 1857 the young Maharajah remained faithful to the British Government, though deserted by his troops.

GWALIOR, a town and capital of the state of Gwalior, 65 miles S. of Agra. Its nucleus is an isolated rock of about 340 feet in height, perpendicular on all sides; it measures 1½ miles by 300 yards, and its citadel, said to date from the 8th century, whose guns sweep the only approach, is virtually impregnable against any native force. Along the E. base of this eminence lies the old town of Gwalior, containing little worthy of notice but a beautiful mausoleum of white sandstone; and to the S. W. there extends for several miles the new town called Lashkar, where the Maharajah resides. Nearly 4 miles to the N. E. is Morar, the British cantonment from 1858 to 1886, when its fine sandstone barracks were handed over, along with the fortress, to Sindhia, and the European headquarters removed to Jhansi. Gwalior possesses two remarkable Hindu temples, and one of the most interesting examples of Hindu palace architecture in India; while Jain caves and rock sculptures abound on all sides. Pop. about 120,000.

GWYNN, ELEANOR, better known by the name of "Nell," a celebrated mistress of King Charles II.; born in London about 1650. She was at first an orange girl, and also gained her bread by singing from tavern to tavern. About 1667 she became the mistress of Lord Buckhurst, who surrendered her about 1670 to the king. As mistress of the king she had an establishment, and was made lady of the privy chamber to Queen Catharine. She was merry and open-hearted, is said to have been faithful to Charles, mindful of old friends, and a liberal patroness of the poets Dryden, Lee, Otway, and Butler. From her are sprung the dukes of St. Albans. She died about 1690.

GYMNASIUM, a public place or building where the Greek youths exercised themselves, fitted up with running and wrestling grounds, baths, and rooms or halls for conversation and discussion. These were the favorite resorts of youth, and for this reason were frequented by teachers, especially philosophers. The three great gymnasia of Athens were the Academy, where Plato taught; the Lyceum, where Aristotle labored; and the Cynosarges. In this connection it is easy to understand the transference of the name to educational institutions. The German gymnasium is an upper school where instruction is carried on largely by means of the classical tongues, preparing its pupils for the university, and corresponding roughly to the grammar and public schools of England and the grammar and high schools of Scotland.

GYMNASTICS, exercises of the body and limbs which tend to invigorate and develop their power. Gymnastic games are of very ancient origin. They are mentioned in the second book of the "Iliad," where playing at quoits and javelin hurling are mentioned. Later on games of this kind were dedicated to the gods, and the rewards being called "athla," gave origin to the name "athletes," applied to those who contend for them.

Shortly before the time of Hippocrates, gymnastics were made a part of medicine, and gradually they were reduced into a complete system. Public buildings, called "gymnasia," were erected for the purpose, and officers for their superintendence were appointed by the state. Among the exercises practiced in these gymnasia were dancing, wrestling, boxing, running, leaping, quoit-throwing, hurling, riding, driving, swimming, rowing, climbing ropes, swinging, mock fights of various kinds, etc. It is only since the commencement of the 19th century that gymnastic exercises have been revived as a science.

GYNÆCOLOGY (jin-ē-kol'ō-ji or gī-nē-), that branch of medicine which treats of the diseases of women.

GYPSEOUS SERIES, in geology, the lower freshwater limestone and marl constituting the Upper beds of the Middle Eocene in the vicinity of Paris, France. They are of white and green marls with subordinate beds of gypsum. At the Hill of Montmartre is a quarry of gypsum valuable for the manufacture of plaster of Paris. Splendid fossil remains of Eocene mammals have been found in it. Similar gypseous marls are worked for gypsum at St. Romain, on the right bank of the Allier.

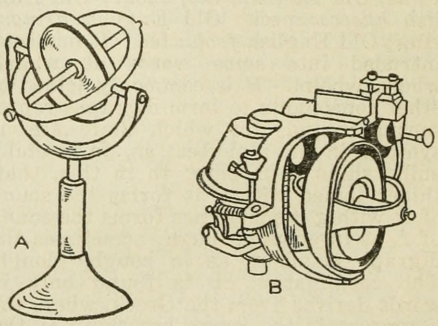
GYPSUM, calcium sulphate crystallized with two molecules of water $CaSo_4 \cdot 2H_2O$. It is often found by the decomposition of pyrites when lime is present. Gypsum calcined is called plaster of Paris, and is used for taking casts of statues. Gypsum is used as a manure; it facilitates the decomposition of rocks containing alkaline silicates.

Technically gypsum is regarded as a mineral deposit, in some places constituting rock masses. It may be of any age. Near Paris it is Middle Eocene. Frapoli says that some gypsums were originally carbonates instead of sulphates of lime, and that they underwent metamorphism by the action of volcanic sulphurous or sulphurohydrous vapors. The production of gypsum in the United States in 1919 was about 3,430,000 short tons, valued at about $16,000,000.

GYPSY MOTH, the *Bombyx dispar* an insect abounding in central Europe, where it does much damage to trees. Linnæus was the first to describe it. The eggs are laid in August and hatch in the spring in the trunks of trees, and on rocks and fences, the caterpillars feeding on plants and trees. After a few months the caterpillars, having attained their full growth, pupate, the moths emerging from the cocoon some weeks after. The insect was brought to America by Leopold Trouvelot, who was experimenting at Medford, Mass., with silkworms, and the specimens escaped. Twenty years later the damage caused by the caterpillars attracted public notice, and since that time, despite public measures taken to cope with the ravage, the gypsy moth has become a pest in many localities in Massachusetts. An effort was made by the Massachusetts State Board of Agriculture to exterminate the insect, and was carried on over a period of ten years, at an expenditure of over a million dollars. The work was not thorough, however, and in recent years the presence of the moth has become so noticeable that public measures have had to be resumed to counteract the injury to plants, shrubs, and trees caused by it. The Massachusetts Board of Agriculture has issued bulletins giving the results of the methods originated by it, and, in so far as these methods have been followed by the various municipalities that have been obliged to deal with the insect, they have borne fruit.

GYROGONITE (ji-rog'ō-nīt), the sporangium, or seed-vessel, of the flowerless plant-genus *Chara*. It is very rough and hard, consisting of a membranous nut, covered by an integument, both of which are spirally streaked or ribbed. The integument is composed of fine spiral valves of a quadrangular form.

GYROSCOPE (jir'ō), an instrument constructed by M. Foucault, to make the rotation of the earth visible. The principle on which it proceeds is this—that, unless gravity intervenue, a rotating body will not alter the direction in which its permanent axis points. In the gyroscope there is a rotating metallic disk, the middle point of whose axis is also the center of gravity of the machine. By this



GYROSCOPE

A. Gyroscope.
B. Gyroscope as used in torpedo.

device the action of gravity is eliminated. The instrument, moreover, is so constructed that the axis of rotation can be made to point to some star in the sky. Then, as the heavy disk whirls round, it is found that the axis continues to point to the moving star, though, in consequence of this, apparently altering its direction relatively to bodies on the earth. If, again, the axis be pointed to the celestial pole, which is fixed, no alteration in its position relative to bodies on the earth takes place. The only feasible explanation of these appearances is that the earth is revolving on its axis. The gyroscope has been a valuable adjunct as a stabilizer in the making of aeroplanes.

H

H, h, the eighth letter of the English alphabet, commonly classed among the consonants, though not strictly such. It is frequently called the aspirate, though other letters are also aspirated in English. Its distinctive or proper sound is that which it has at the beginning of a word, as help, hard, hope, etc. This sound it also has when following w, as in whither, where, in which cases it originally preceded the w, as in Old English, *hwidir, hwær.* H has disappeared from many words, especially before l, n, r: as, Old English, *hlaf*=loaf; Old English *hnecca*=neck; Old English *hring*=ring; Old English *feoh*=fee. It has been intruded into some words as wharf, whelk, whelm. H is commonly joined to other consonants to form digraphs representing sounds for which there are no symbols in the alphabet; as, ch in child, chill; sh in shin, ship; th in this, that, thine; joined with p it forms the sound of f; with g it sometimes forms the sound of f, as in enough, tough; sometimes the digraph is silent, as in bough, plough. The combination rh is found only in words derived from the Greek, where the h represents the rough breathing of the original rh. Ch is common in words derived from the Greek, and in such cases is generally hard, as chemistry, chyle, etc. It sometimes represents the Latin c, Greek k, as in English horn=Lat. *cornu,* Gr. *keras.*

HAAKON VII, king of Norway, first exclusively Norwegian king since 1380. He was born in 1872, a grandson of Christian IX. of Denmark and was called Prince Charles. He married Princess Maud, daughter of Edward VII., in 1896. A son, Olaf, was born in 1903. On the separation of Norway and Sweden he was tendered the Norwegian throne and took the coronation oath Nov. 27, 1905. Crowned at Trondhjem in June, 1906.

HAAN, WILLIAM GEORGE, an American soldier, born at Crown Point, Ind., in 1863. He graduated from the United States Military Academy in 1889, and in the same year was appointed 2d lieutenant of the 1st Artillery. During the Spanish-American War he acted as captain and acting quartermaster of volunteers, and was honorably discharged from the volunteer service in 1901. In the same year he was appointed captain of the Artillery Corps. He was promoted through the various grades, becoming colonel in 1916. In 1917 he was appointed brigadier-general of the National Army, and commander of the 57th Field Artillery Brigade. He was commander of the 32d Division in January, 1918, having been appointed temporary brigadier-general in the previous year. He was made permanent brigadier-general in 1918. He commanded the 32d Division in three major offensives, the Marne to Vesle, the Oise-Aisne, and the Meuse-Argonne. He commanded the 7th Army Corps, as part of the Army of Occupation in Germany, from November, 1918, to April, 1919. In the latter year he was assigned as assistant chief of Staff and as director of the war plans division. He was awarded the Distinguished Service Medal and the Croix de Guerre. He was promoted to major-general in 1921.

HAARLEM (här'lem), a town of Holland; 10 miles W. of Amsterdam; is intersected, like most Dutch towns, with canals and avenues of trees. Its principal church is the Great or St. Bavon's, a Late Gothic basilica, built in the 15th century, one of the largest churches in Holland, and specially noted for its lofty tower and its organ (1738). Before the church stands a statue of Laurens Coster, to whom his countrymen ascribe the invention of printing. The town hall, formerly the residence of the Counts of Holland, has portraits by Franz Hals, and a valuable collection of early printed works. The Teyler Institution promotes the study of theology. natural science,

and the fine arts. Though Haarlem is no longer celebrated, as in the 17th century, for its flourishing trade, it still weaves cotton, casts type, bleaches linen, and carries on an extensive trade in flowers, especially in tulips, hyacinths, and other bulbs. It was a flourishing town as early as the 12th century, when it took an important part in the wars between the Hollanders and West Frisians. At the close of the 15th century it was deprived of its privileges by Albert of Saxony, and it suffered severely during the revolt of the peasantry (1492). During the war of independence, it underwent a seven months' siege (1572-1573) from the Spaniards, in which the citizens displayed the noblest heroism. The wood of Haarlem is a favorite place for recreation; in it stands the pavilion, which contains the colonial and industrial museums and a collection of modern pictures. Pop. (1918) 75,280.

HAASE, HUGO, a German statesman. He was born in 1863 and soon became prominent in the Socialistic party. After Bebel's death he succeeded him as president of the German Social Democratic party. Beginning with 1897 he served continually in the Reichstag with the exception of 1907, when he, together with most of the Social Democratic members, was defeated. At the outbreak of the war he refused to follow the majority of his party in their support of the government's policy, and in 1915 he formed the Independent Socialist party, taking, together with his followers, the stand that war credits should be refused, even at the risk of a German defeat. The stand taken by Haase and his group undoubtedly was one of the principal factors in bringing about the German revolution, and the naval mutiny in August, 1918, was ascribed to their propaganda. Throughout the entire war he courageously attacked the imperialistic policies of Germany. Upon the fall of the Imperial Government in November, 1918, he became a member of the first coalition cabinet, but after a month's service resigned as a result of continuous conflicts with the more conservative members of the Social Democratic party. After his resignation he attacked the coalition between the Social Democrats and the Center party, and although not willing to go quite as far as the Sparticides, he co-operated with the latter to some extent. He strongly opposed the aggressive policy of the Minister of Defense, Noske, in putting down strikes and revolts. He was assassinated on Oct. 8, 1919, by an Austrian, and died in Berlin, Nov. 7, 1919.

HABAKKUK (ha-bak'uk or hab'a-kuk), in the Old Testament, the eighth of the minor prophets. It was composed when the Chaldean invasion was imminent, probably in the early part of the reign of Jehoiakim, about 610 B. C. The prophet's poetic genius is of a high order, the third chapter of the work being one of the finest compositions in the whole Old Testament. Nothing is known of the writer's history. Several passages are quoted in the New Testament, the thrice repeated doctrine that "the just shall live by faith" (Rom. i: 17; Gal. iii: 11; and Heb. x: 58), which excited so powerful an influence on Luther's mind, being derived originally from Hab. ii: 4. Hab. i: 5, is quoted in Acts xiii: 40, 41.

HABANA. See HAVANA.

HABEAS (hā'bē-as) **CORPUS**, in law, a writ (more fully *habeas corpus ad subjiciendum*) directed to the person detaining another, and commanding him to produce the body of the prisoner, with the day and cause of his caption and detention, *ad faciendum, subjiciendum, et recipiendum*, to do, submit to, and receive whatsoever the judge or court awarding such writ shall consider in that behalf. It is applicable in all cases where a person in custody claims to be illegally detained, or wrongfuly refused bail, or who desires to be removed from one court to another. The Habeas Corpus Act has been substantially incorporated into the jurisprudence of every State in the Union, and the right to the writ has been secured by the constitutions of most of the States, and the United States. The Constitution of the United States, art. 1, sec. 9, par. 2, provides, that "the privilege of the writ of *habeas corpus* shall not be suspended, unless when, in cases of rebellion or invasion, the public safety may require it." A similar provision is contained in many of the State constitutions.

HABIBULLAH KHAN, a former Ameer of Afghanistan, born in Samarkand, 1872, assassinated in Afghanistan, Feb. 24, 1919. His father, Abdur Rahman, was in exile at the time of his birth. On his father's death, in 1901, who meanwhile had been reinstated as Ameer, the young prince ascended the throne. Although previously known as anti-British, he visited India soon after his rise to power, and ever after maintained friendly relations with the British Viceroy. During the World War he maintained strict neutrality, and shortly before his death was arranging an anti-Bolshevik alliance with neighboring rulers of central Asia.

HACKENSACK, a city and county-seat of Bergen co., N. J., on the Hackensack river, and on the New York, Susquehanna and Western, and the New Jersey and New York railroads; 14 miles N. W. of New York City. It is a residential city, but has brick, silk, and other manufacturing interests. There are a court house, public library, public high school, daily and weekly newspapers, gas and electric lights, waterworks, and electric street railways connecting with surrounding towns and cities, and with New York. Hackensack was settled by the Dutch in the latter part of the 17th century, and during the Revolution was occupied in turn by the British and American armies. Pop. (1910) 14,050; (1920) 17,667.

HACKETT, JAMES HENRY, an American actor; born in New York City, March 15, 1800. He was particularly successful in impersonating Yankees and Westerners, but was best known by his Falstaff, which he played first about 1832. He wrote "Notes and Comments on Shakespeare" (1863). He died in Jamaica, N. Y., Dec. 28, 1871.

HACKNEY, a parish of Middlesex, England, now forming a suburb of London, and 3 miles N. N. E. of St. Paul's. It was at one time a favorite suburban residence of London citizens. In its earlier and fashionable days it is by some said to have given its name to hackney coaches. See CABS.

HACO (hā'kō) **V.**, surnamed the Old, King of Norway. He acceded to the throne in 1217, and during his reign Greenland and Iceland were added to Norway. On his way home from Scotland, where he had fought the battle of Largs against Alexander III., he died in the Orkneys, about 1263. See NORWAY.

HADDINGTON, the county-town of Haddingtonshire, Scotland, at the S. base of the Lammermuir Hills, on the Tyne, 17 miles E. of Edinburgh. Its Abbey Church, the Lucerna Laudoniæ or "Lamp of Lothian," is a cruciform Decorated red sandstone pile, with a central tower 90 feet high, and ruinous all but the nave, which serves as the parish church. There are also the county buildings (1833), the large corn exchange (1854), the town hall (1748-1831), the county lunatic asylum (1866), and a school, the Knox Memorial Institute (1880). Haddington's worthies have been Knox, John Brown and Samuel, his grandson, Samuel Smiles, and Jane Welsh Carlyle. Here the English endured a great siege by the Scotch in 1549. Pop. 4,200.

HADDINGTONSHIRE, or East Lothian, a county of Scotland, in the southeastern part. It has an area of 267 square miles. The southern part contains the Lammermuir Hills, which rise to a height of over 1,700 feet. The principal river is the Tyne, which flows in a northeasterly direction across the county into the sea of Tyningham. It has important agricultural interests and is the center of a coal mining region. The chief towns are Haddington, the capital, Dunbar, and North Berwick. Pop. about 45,000.

HADDOCK (*Gadus æglefinus*), a fish of the same genus with the cod, and much resembling it in general appearance. The number of fins are the same, there being three dorsals and two anals. The haddock, like the cod, has a barbule at the point of the lower jaw. The haddock is brown on the back, silvery on the belly; the lateral line is black, and there is a black spot behind each of the pectorals, these spots sometimes extending so as to meet on the back. An ancient legend ascribes these spots to the finger and thumb of St. Peter, and states the haddock to be the fish from the mouth of which he took the tribute money. The haddock is not found in the Mediterranean. Nor does it enter the Baltic, though plentiful in the N. parts of the Atlantic Ocean, both on the European and the American coasts. On the British coasts it is abundant almost everywhere. Those of Dublin Bay are remarkable for their large size. It is taken both by trawl nets and lines. In March and April the haddock is out of season; in October, November, December, and January it is in finest condition. See FINNAN.

HADDONFIELD, a borough of New Jersey, in Camden co. It is on the West Jersey and Seashore railroad. It is a residential suburb of Philadelphia, but has important industrial and agricultural interests. It is the site of the Shepherd's Home, Bancroft Training School, and has two parks and a library. Pop. (1910) 4,143; (1920) 5,646.

HADEN, SIR FRANCIS SEYMOUR, an English etcher and surgeon; born in London, England, Sept. 16, 1818. In 1857 he was elected a Fellow of the College of Surgeons. "Etched Work of F. S. Haden" contains 185 plates from his hand; others have been published. The chief qualities of his work are vigor and breadth. He was president of the Society of Painter Etchers, and wrote "Etched Work of Rembrandt" (1879-1880), "Lectures" and "About Etching" (1881). He died June 1, 1910.

HADES (hā'dēz), in Homer the Greek word Ades figures as the name of a god, in large measure corresponding to the Roman Pluto. After Homer it becomes a place to which the dead go. Both Greeks and Romans supposed the infernal regions to be in the center of the earth. To enter these, in the Roman opinion, the river Styx had to be crossed by the spirits of the dead, Charon, the ferryman, for a small sum, rowing the boat. If, by any misfortune the body had been unburied, the soul had to wander 100 years on the banks of the Styx before it was taken across. Pluto was the king of the spirit world. Rhadamanthus its most noted judge.

In the Jewish belief, the place of the dead; the Hebrew *sheol*, which occurs 65 times in the Hebrew Bible, and in 61 of them is rendered in the Septuagint *Hades*. In the Authorized Version of the English Bible it is translated in the Old Testament 31 times by "grave," 31 times by "hell," and 3 times by "pit." The ancient Hebrews conceived of Sheol as situated below, so that souls had to "go down" or descend before entering it.

In Christian doctrine, one of the two words rendered in the Authorized Version by the ambiguous term HELL (*q. v.*).

HADING, JANE (ä-dan'), a French actress; born in Marseilles, France, Nov. 25, 1859. She went on the stage in early childhood, and toured the United States in 1885 and 1896. Her best rôles are in such pieces as "The Forge Master"; "Marriage"; etc.

HADLEIGH (had'li), a quaint old market-town of Suffolk, England, on the Bret, 9½ miles W. of Ipswich. Its chief buildings are the brick Rectory Tower (1495) and the noble parish church, with a spire 135 feet high. Formerly, from 1331, an important seat of the cloth trade, Hadleigh was the scene of the death of the Danish king Guthrum (889), of the martyrdom of Dr. Rowland Taylor (1555), and of the great conference (1833) out of which grew the "Tracts for the Times," and at which Newman, Hurrell Froude, Trench, and Rose, the then rector, were present.

HADLEY, ARTHUR TWINING, an American educator; born in New Haven, Conn., April 23, 1856; was graduated at Yale College in 1876; studied at the University of Berlin; was Professor of Political Science at Yale University in 1886-1899 and was then elected its president. He resigned in 1920. He is the author of "Economics, an Account of the Relations Between Private Property and Public Welfare"; "Railroad Transportation, Its History and Laws"; and "Report on the System of Weekly Payments"; "Freedom and Responsibility" 1903); "The Standard of Public Morality" (1907); "Undercurrents in Ameri-



ARTHUR TWINING HADLEY

can Politics" (1915). Chairman of Railroad Securities Commission (1910).

HADLEY, HENRY K., an American musician and composer, born at Somerville, Mass., in 1871. He studied music in Boston and in Europe. In 1895 he was appointed instructor in music in St. Paul's School, Garden City, L. I. He composed over 150 songs and pieces of music for the piano, as well as overtures, symphonies, chamber music, and other musical forms. He won many prizes for excellence in musical composition, and composed the operas "Azora" and Bianca." He was a member of the National Institute of Arts and Letters.

HAECKEL, ERNST HEINRICH, a distinguished German naturalist; born in Potsdam, Prussia, Feb. 16, 1834. He studied natural science and medicine at Würzburg, Berlin, and Vienna under Müller, Virchow, and Kölliker. After working for a while at Naples and Messina, he became a privatdocent in the University of Jena in 1861, a professor extraordinary in 1862, and an ordinary Professor of Zoölogy in 1865. His purely scientific works have been translated into many languages. His popular books include: "On the Division of Labor in Nature and Human Life" (1869); "On the Origin and Genealogy of the Human Race" (1870); "Life in the Great Marine Animals" (1870); "The Calcareous Corals," (1873); "The System of the Medusa" (1880); "The Riddle of the Universe" (1902). A supple-

mentary volume to this work called (English translation) "The Miracles of Life" appeared in 1910. Thoughts on the war —"Eternity" (1916). He died Aug. 9, 1919.

HÆMATITE, a mineral consisting chiefly of peroxide of iron; a valuable iron ore. There are two principal varieties, red hæmatite and brown hæmatite. See IRON.

HÆMOGLOBIN (-glō'bin), an albuminoid substance which forms the chief part of the red corpuscles of the blood of vertebrata. The defibrinated blood is mixed with dilute alcohol; after 24 hours the hæmoglobin separates out in violet-red rhombic octohedra. It is soluble in water, forming a red solution, and is reprecipitated by alcohol. The aqueous solution of hæmoglobin has two absorption bands in its spectrum, by which the presence of blood can be detected.

HÆMORRHAGE, bleeding from the heart, arteries, capillaries, or veins, capillary hæmorrhage being the commonest form. Generally, though not invariably the vessels are ruptured. In a solid organ it is called an extravasation, hæmorrhagic infraction (in embollism), or apoplexy. Hæmorrhage from the nose is known as epistaxis; from the lungs, hæmoptysis; from the stomach, hæmatemesis; from the female genitals, menorrhagia; from the urine, hæmaturia; from the bowels, melæna. The general indications for treatment are to stop the bleeding and prevent its recurrence.

HAFF, an extensive bay or gulf of Pomerania, Prussia, 10 miles N. of Stettin, at the mouth of the Oder, separated from the Baltic by a strip of land.

HĀFIZ (hâ-fiz'), the poetical name of KHWAJA SHAMS-AD-DIN MUHAMMAD, Persia's famous lyric-poet; born in Shiraz, about 1300. The most complete English edition of his works is that of H. Wilberforce Clarke: "The Dīvān ī Hāfiz, Translated" (1891). Hāfiz seems to be most characteristic in his many "Ghazels" or odes, whose themes are his own emotions. Sir William Jones was one of the first English translators. Other English translations include: "Persian Poetry for English Readers" (privately printed, 1883), by S. Robinson; "Ghazels from the Divan of Hāfiz" (1893), by Justin Huntley McCarthy. He died in Shiraz, in 1389.

HAGADA (ha-gä'dä), in Hebrew literature, a branch of the Midrash, or most ancient Jewish exposition of the Old Testament; extends over the whole of these sacred books and is homiletic and poetical.

HAGEN (hä'gen), an industrial town of Prussia, in the Ruhr coal district of Westphalia, 12 miles N. E. of Elberfeld-Barmen. Prior to the World War it carried on a great deal of puddling and iron founding, and has manufactures of iron, steel, and tin goods, cotton, cloth, leather, paper, beer, and tobacco. Pop. about 90,000.

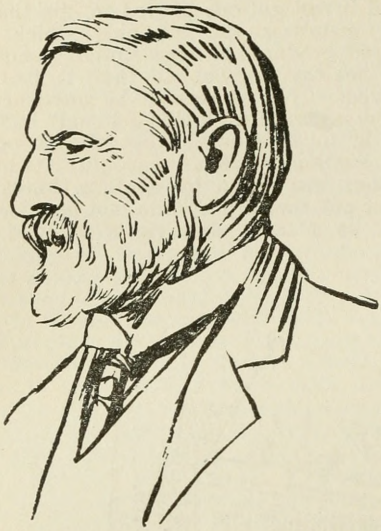
HAGENAU (hä'ge-nou), a town of Alsace-Lorraine; in the Hagenau forest, on the Moder, 21 miles N. by E. of Strassburg. It manufactures porcelain stoves, and has cotton and woolen spinning. The chief trade is in hops and wine. The Romanesque church of St. George dates from the 12th century, and the Gothic church of Nicholas from the 13th. Pop. about 19,000.

HAGERSTOWN, a city and county-seat of Washington co., Md., on Antietam creek, and on the Baltimore and Ohio, the Cumberland Valley, the Norfolk and Western, and the Western Maryland railroads; 22 miles N. W. of Frederick. It has extensive manufactures of knit goods, pipe organs, automobiles, silk, machinery, steam engines, lumber, sashes, doors, blinds, etc. It is the trade center of Western Maryland and contains a court house, the male high school, and electric lights and street railways, daily and weekly newspapers, 3 National banks. Pop. (1910) 16,690; (1920) 28,064.

HAGGAI (hag'i), in the Old Testament, the 10th of 12 minor prophets. Of the seer himself nothing is known. His book has always been regarded as canonical. The several dates are all in the second year of Darius the king—*i. e.*, of Darius Hystaspes, B. C. 520. The prophet aims at inducing the people without delay to resume the rebuilding of the temple which had been commenced in 535, the second year of Cyrus, but had been discontinued, owing to Samaritan and other opposition.

HAGGARD, SIR HENRY RIDER, an English novelist; born in Norfolk, England, June 22, 1856. He was a barrister by profession. At the age of 19 he accompanied Sir H. Bulwer as secretary to Natal, and served on the staff of Theophilus Shepstone during his mission to the Transvaal. He wrote: "Cetywayo and His White Neighbors" (1882); "King Solomon's Mines" (1886); "She" (1887); "Beatrice"; (1890); "History of the Transvaal" (1900); "Rural England" (1902); "Fair Margaret" (1907); "The Morning Star" (1910); "Red Eve" (1911); "Child of the Storm" (1913);

"The Holy Flower" (1915); "Finished" (1917); "Love Eternal" (1918); "When the World Shook" (1919).



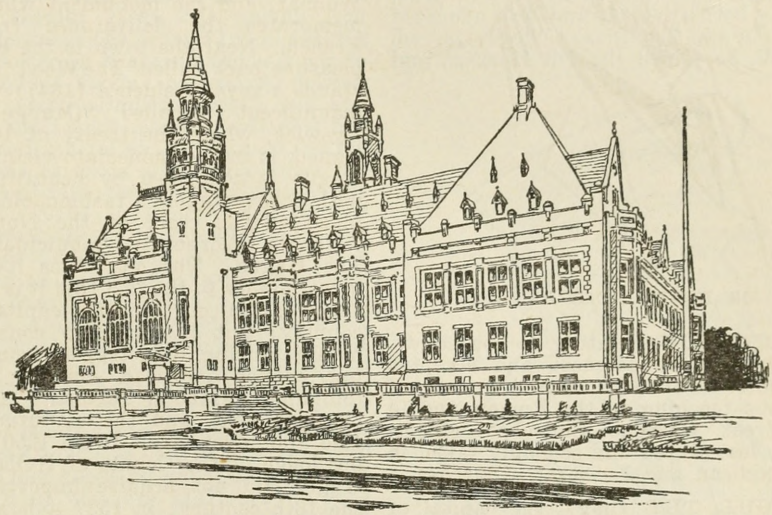
SIR HENRY RIDER HAGGARD

HAGIOLOGY, relating to the saints, or holy persons deceased and accepted as saints. This is a sacred branch of religious teaching in the Roman and in the Greek Catholic Churches and is hardly less sacred and solemnly taken in the Anglican and Lutheran Churches.

HAGUE, THE (hāg), the capital of the Netherlands, 2 miles from the North Sea and 15 N. N. W. of Rotterdam. It is one of the handsomest cities in the country, being intersected by canals and shady avenues of lime-trees, and having many fine public buildings and private houses. In the center of the city is the Vijver, or fish pond, to the S. of which stands the old castle of the counts of Holland. It consists of two courts, an outer and an inner; in this latter are the 13th-century Gothic knight's hall and the chambers in which the Dutch parliament holds its sittings. On one side of the outer court stands the gate tower, which was formerly a state prison, in which the brothers De Witt were confined till torn to pieces by the populace (1672). The most noteworthy public buildings and institutions are the picture gallery, with a splendid collection of works by native painters (Paul Potter's "Bull" and Rembrandt's "Lesson in Anatomy"); the royal library, with 200,000 volumes, 4,000 MSS., and collections of coins and gems; the municipal museum, with several Dutch pictures; the Museum Meermanno-Westreenen, containing a collection of early printed books; the ethnographic museum, rich in Chinese and Japanese objects; the town-house; and the royal palaces. The church of St. James is the most important ecclesiastical edifice; it dates from the 14th century, and is Gothic in style. The Hague is the seat of several learned societies, as the Indian Society and the Institute for the Language, Land, and People of the Dutch Indies. Among the numerous statues are those of William I. (two in number), William II., Spinoza, Bernhard of Saxe-Weimar, and the monument which commemorates the deliverance from the French. Near the town is the beautiful pleasure park called "The Wood" in which stands a royal residence (1647) with the magnificent so-called "Orange Hall." Ryswick, where the treaty of 1697 was signed, is in the immediate vicinity. The Hague is connected by beautiful roads with Scheveningen, a fashionable bathing place on the coast of the North Sea, which is incorporated municipally with The Hague. The city owes its importance mainly to the fact that it is the residence of the court and the capital of the country; but it has also considerable manufacturing industry, as iron founding, copper and lead smelting, cannon founding, printing, furniture and carriage making, and the manufacture of gold and silver lace. From 1250 a hunting lodge of the Counts of Holland, The Hague did not acquire importance till the 16th century; in 1527 it became the seat of the supreme court in Holland, in 1584 the place of assembly of the States of Holland and of the States-general; and it was also the residence of the stadtholders. There, too, numerous treaties have been signed and diplomatic conferences held, especially the Triple Alliance of 1668 and that of 1717. Here also was held the International Peace Congress of 1899, and 1907, and the Hague Conference of 1907. A magnificent Peace Palace was erected for the meetings of the Peace Conference by Andrew Carnegie. Pop. (1918) 352,079.

HAGUE, ARNOLD, an American geologist; born in Boston, Mass., Dec. 3, 1840; was graduated at the Sheffield Scientific School of Yale College in 1863 and then studied abroad. Returning to the United States he spent about 10 years in the West investigating the Comstock lode. In 1877 the government of Guatemala appointed him geologist, and he visited the centers of volcanic activity and the chief mining districts of that country. In the following year he was

employed by the Chinese government to study the gold, lead and silver mines in northern China. In 1879, when the United States established the geological survey, he accepted a place in that bureau. His publications include "The Volcanoes of California, Oregon, and Washington Territories"; "The Volcanic Rocks of the Great Basin" (1884); "On the Development of Crystallization in the Igneous Rocks of Washoe" (1885); "Nevada, with Notes on the Geology of the District" (1885); "Atlas of the Yellowstone National Park" (1904), etc.



THE HAGUE PEACE PALACE

HA-HA BAY, an inlet of Saguenay river, in Chicoutimi co., Quebec, Canada, midway between Lake St. John and the St. Lawrence river; known also as Grande Bay. It is connected with Great and Little Ha-Ha Lakes by the Ha-Ha river; the bay is about 7 miles long, 1 mile wide, and 600 feet deep.

HAHNEMANN, CHRISTIAN FRIEDRICH SAMUEL (hä'ne-män), the founder of HOMŒOPATHY (*q. v.*); born in Meissen, Saxony, April 10, 1755. He entered the University of Leipsic at the age of 20; from Leipsic he proceeded to Vienna for clinical study; he then passed two years as physician and librarian to a nobleman residing in Transylvania; after which he entered and, in 1779, graduated at the University of Erlangen. During the following 10 years he practiced medicine and held several public appointments in Dresden and elsewhere, and then settled in a small village near Leipsic. His observation and practice had convinced him, not only of the uselessness, but also of the injurious character of the prevailing methods of treatment. Six years of study and investigations proved to him that in all instances the medicine which had cured produced a very similar condition in healthy persons to that it had relieved. This conclusion he published in an essay in "Hufeland's Journal" in 1796. It is in this essay that the principle of *similia similibus curantur* (similar things are cured by similar things) is first put forward by him, not as a theory but as a fact. His views at once met with vehement opposition. Apothecaries refused to dispense his prescriptions, and he was forced to give his medicine to his patients free of charge. This was an infringement of the privileges which German law had conferred on the apothecaries, and hence he was prosecuted in every town in which he attempted to settle from 1798 till 1810, when he returned to Leipsic. Two years afterward he was appointed a privat-docent of the university. At Leipsic he remained till 1821, when a successful prosecution by the apothecaries drove him from the city. Under the protection of the Duke of Anhalt-Köthen he retired to Köthen, where he became a center of attraction to numerous invalids in all parts of the world. He became known as one of the earliest advocates of hygiene. His book entitled "The Friend of Health" (1792) proves him to have been far in advance of his time in preventive medicine. Equally so was he in the treatment of the insane. He was also the author of several valuable papers on chemistry. He

died in Paris, July 2, 1843. A statue of him was erected in Leipsic in 1851.

HAIFA (hī'fä), a seaport of Syria; at the foot of Mount Carmel. A little distance to the N. W. a settlement of the Württemberg "Society of the Temple" was founded in 1869, who now form a flourishing agricultural colony, chiefly engaged in cultivating the vine and growing fruits. Grain is exported. Gordon Pasha paid visits to Haifa, and here Laurence Oliphant settled in 1882.

HAIG, DOUGLAS, 1st Earl, British Commander-in-Chief in the World War. He was born in 1861, and was educated at Clifton and Brasenose College, Oxford. In 1885, he joined the 7th Hussars and



FIELD-MARSHAL HAIG

served in the Soudan in 1898, distinguishing himself at Atbara and Khartoum, being mentioned in despatches, Brevet-Major, British medal, Khedive's medal with two clasps. When the war against the Boer Republic broke out in 1899, he went to south Africa and commanded cavalry in Natal, being C. S. O. to General French during the Colesberg operations; A. A. G. Cavalry Division, 1900. In 1901-1902 he commanded a group of columns and was mentioned in despatches, becoming A. D. C. to the King, Brevet-Colonel, Commander of the Bath, receiving also the Queen's medal with seven clasps and the King's medal. During 1901-1903 he was Lieutenant-Colonel Commander of the 17th Lancers and during 1903-1906 Inspector-General of the Cavalry in India. He became Major-General in 1904, and Lieutenant-General in 1910, becoming in 1914, General for distinguished service, following the outbreak of the World War. Up to that period his military experience had been varied. During 1906-1907 he had been Director of Military Training and during 1907-1909 Director of Staff Duties at Army Headquarters. In 1909-1912 he was Chief of Staff in India, and was General Officer Commanding at Aldershot in 1912-1914. In the World War he commanded the 1st Army in 1914-1915, and from 1915 to the end of the war was Commander-in-Chief of the Expeditionary Forces in France and Flanders. It was during the great retreat toward Amiens in 1917, when the renewed energy of the Germans made it appear that the British Army was about to be routed and the French Atlantic ports were to fall into their hands, that Haig uttered his call to America, declaring that he and his men had "their backs to the wall." He continued as Commander-in-Chief of the British Army till 1919. He was made Lord Rector of St. Andrew's University in 1917, and, among the other honors that were showered on him during the war, received the Grand Cordon Legion of Honour, Grand Cross Order of Leopold, Grand Cross St. Maurice and St. Lazarus, Obolitch Gold Medal (Montenegro), 1st Class Order of Danilo, and 4th Class of St. George (Russia). He was present at the negotiations with the Germans and at the Council of Versailles. Following the war he spent much of his time on the Haig property in Fife and Midlothian. In 1907, he wrote a book called "Cavalry Studies."

HAIL, the fall of aërial moisture in the form of ice. Hail occurs in two unlike forms, of different origin, which are now distinguished as hard, or true hail, and soft hail. The latter, often also known as sleet, denotes the fine, light rains that frequently fall in winter, rarely in summer, and seem an accompaniment of snow. True hail occurs in hard, compact, irregular masses of ice, either clear or opaque, both kinds often occurring in alternate layers in a hailstone.

HAILEYBURY COLLEGE, an English public school at Hailey, Hertfordshire, 19 miles north of London. The present school which is frequently known as New Haileybury, is a continuation of Old Haileybury or the East India College.

HAINAN, an island of China, in the province of Kwang-tung, E. of the Gulf of Tonquin, separated from the mainland of China by a channel of but 10 miles in width; lat, 18° 10′ to 20° N., lon. 108° 25′

to 111° E.; area 16,000 square miles. Pop. about 2,000,000. The E. coast is steep and rocky; the N. W. coast is unapproachable because of sand-banks; but the S. coast is indented with several commodious and safe harbors. The interior of the island is mountainous and barren, but the low lands near the sea are fertile and well cultivated. Products, sugar, pearls, coral, wax, gold, and silver. The metropolis of the whole island is Kiangchow. Pop. over 50,000. Though the Chinese have possessed this island since 108 B. C., yet there are in the interior some wild and hitherto unsubdued tribes.

HAINAULT, a frontier province of Belgium, bounded E. by Namur, N. by Brabant, E. and W. by Flanders, and on the S. W. by France; area, 1,437 square miles. Products, wheat, flax; excellent breeds of horses, horned cattle; and sheep are also reared. Extensive coal fields, iron mines, marble and limestone quarries. Pop. (1918) 1,214,093. Manufactures, linen, porcelain, and pens. Principal rivers, Haine (whence the name), Sambre, Meuse, and Scheldt. Chief towns, Mons (the capital, pop. about 27,000), Tournay, Ath, Soignies, Charleroi, and Thuin. Hainault was governed by a regular succession of counts from the time of Regnier I., who began to reign about 860. In 1436 it passed into the hands of Philip the Good, Duke of Burgundy, and by the treaties of the Pyrenees, Nov. 7, 1659, and of Nimeguen, Sept. 17, 1678, part was ceded to France, forming the province of French Hainault. In 1814 it was allotted to the Low Countries, and in 1830 was incorporated with Belgium. The province was overrun by the Germans and occupied by them in the first months of the World War. At Charleroi and Mons the French and British suffered reverses that forced their retreat to the Marne.

HAINBURG (hīn'börg), a walled town of Austria; on the Danube; 27 miles E. S. E. of Vienna, with a royal tobacco factory. It is usually identified with the ancient Carnuntum; and a Roman aqueduct still supplies its market place with water. In the "Nibelungenlied" the castle of Hainburg is called Heimburc, the border fortress of the country of the Huns. It was taken from the Hungarians in 1042 by the Emperor Henry III., and afterward became a residence of the Austrian princes. In 1482 it was stormed by Matthew Corvinus, in 1683 by the Turks; and in 1827 it was burned to the ground. Pop. about 15,200.

HAINICHEN (hī'nich-en), a town of Saxony, the center of the German flannel manufacture; 13 miles N. E. of Chemnitz. Besides its staple product, it also manufactures cloth, leather, chenille, and plush. Here Gellert was born in 1715.

HAIR, a small filament issuing from the skin of an animal, and from a bulbous root; or the collection or mass of filaments growing from the skin of an animals, and forming an integument or covering.

HAITI, a republic on the island of Haiti, W. I.; bounded by the Dominican Republic, Atlantic Ocean, and Caribbean Sea; area 11,072 square miles; Pop. about 2,500,000; Port-au-Prince, capital (1919) 101,272; other important towns are: Cape Haïtien (19,000), Cayes (12,000), Gonaïves (30,000), Port de Paix (10,000).

Topography.—The country is mountainous, being traversed by a volcanic range, which sends out lateral spurs, terminating in headlands on the coast. Cibao, the loftiest peak, reaches an altitude of 7,000 feet. The rivers are small and few in number and unnavigable. The lakes are quite numerous, and the salt lake of Henriquillo, near the S. shore, is remarkable for showing, by its tides, subterranean connection with the Caribbean Sea.

Climate and Productions.—The climate is semi-tropical, but tempered by the sea breezes, and this, with its well-watered soil, makes Haiti the most fertile of the West Indies. The industries of Haiti are mainly agricultural, coffee being the principal product. Cocoa, cotton, sugar, and tobacco are grown, and considerable rum, and other spirits distilled. The mineral resources are undeveloped, but are known to be of considerable importance. Copper, iron, nickel, gypsum, limestone, and porphyry are found in the N.

Commerce.—Imports in 1918 were valued at $10,500,000; exports $11,000,000. The exports consist principally of coffee, cocoa, logwood, cotton, hides, skins, corn, mahogany, and honey. The import trade is carried on principally with the United States, Great Britain, France, and Spain. In 1917 the external debt of Haiti was 120,912,060 francs, the internal debt 3,368,705 francs.

Government.—The government is that of a republic. The constitution dating from June 14, 1867, was revised in 1918. The legislative authority rests in a National Assembly, divided into two chambers, the Senate and the House of Representatives. The deputies are elected for 2 years, 1 for every 60,000 population. The Senate consists of 15 members elected by popular vote for a term of six years. The executive power is vested

in the president, elected by the National Assembly for a term of four years. The administration is carried on under the president by 5 secretaries. President in 1919 (elected in 1915), M. Philippe S. Dartiguenave.

Religion and Education.—The authorized religion is nominally Roman Catholic. Instruction in elementary grades is free, and supported by the government to the extent of $1,000,000 annually. Education was made compulsory in 1910. In 1918 there were 886 schools with about 66,500 students.

History.—Haiti was a French colony previous to 1804 when it was proclaimed independent. Several insurrections have taken place, and attempts have been made to annex it to the United States. The inhabitants are mostly negroes or mulattoes, speaking either French or a dialect known as Creole French. An armed constabulary was established in 1910 consisting of 110 officers and 26,888 men. In 1912 the United States Government used its influence to prevent a war between Haiti and the Dominican Republic. In 1914 owing to insurrections and threatened international complications the United States landed marines, occupied the fort, took charge of the customs and practically assumed a protectorate over Haiti. In July, 1918, the republic declared war against the Central Powers.

HAKE, a genus of fishes of the cod family (*Gadidæ*), having a flattened head, an elongated body, two dorsal fins, of which the first is short, and the second very long, one very long anal fin, and the mouth destitute of barbels. One species, the common hake (*M. vulgaris*), is found in the British seas, in those of the N. of Europe, and in the Mediterranean. It is sometimes 3 or 4 feet in length; and is of a whitish color, grayish on the back. It is a very voracious fish, devouring great numbers of herrings and pilchards; hence it is frequently called the herring hake. It is important as an article of human food and of commerce, being salted and dried in the same manner as cod and ling. It is generally taken by lines, like cod and ling. One other species is known, *M. gayi*, which is common in the Strait of Magellan and on the coasts of Chile, and also occurs in New Zealand.

HAKE, THOMAS GORDON, an English poet and physician; born in Leeds in 1809. He took his medical degree at Glasgow University in 1831, and practiced his profession in East Anglia, later becoming the physician and friend of Dante Gabriel Rossetti. His poetry is thoroughly original, but quaint, vague, and subtly philosophical. His works include: "Poetic Lucubrations" (1828); "Vates: A Prose Epic" (1839); "New Symbols," verse (1875); "Maiden Ecstasy," verse (1880); "A Divine Pastoral" (1883). He died in London, Jan. 11, 1895.

HAKLUYT, RICHARD (hak'lŏt), an English author; born about 1553; was educated at Oxford University. He was the author of "Four Voyages Touching the Discovery of America and Islands Adjacent to the Same" (1582); "Four Voyages to Florida" (1587); "The Principal Navigations, Voyages, and Discoveries Made by the English Nation"; etc. He died Oct. 23, 1616.

HAKODATE (hä-kō-dä'tā), the chief port of Yezo, Japan, situated on a peninsula in the Strait of Tsugaru. The town is built partly on the inner slope of the Gibraltar-like hill (1,200 feet) which dominates the strait, partly on the low, sandy peninsula connecting the hill with the main island. The climate is severe. Hakodate, which has a magnificent harbor, is (since 1859) one of the open ports of Japan, and carries on a brisk export trade in seaweed, sulphur, bêche de mer, salted salmon, matches, etc. Pop. about 102,400.

HAL (häl), a town in South Brabant, Belgium; 9 miles S. S. W. from Brussels. The church of St. Mary (1341-1409) is much resorted to by pilgrims on account of a black miracle-working wooden image of the Virgin, which during a bombardment in 1580 caught 33 cannon-balls in her lap—they lay piled up in the tower. Pop. about 14,300.

HALBERSTADT (häl'ber-stät), a quaint old town of Prussian Saxony; in a fertile plain extending from the N. foot of the Harz Mountains, 25 miles S. W. of Magdeburg. The cathedral, containing fine painted glass, and valuable antiquities and objects of art, restored in 1850-1871, is the most notable building in the town. It was erected in the 13th and 14th centuries in the Pointed style. Other buildings of interest are the church of Our Lady (1146), with antique reliefs and wall-paintings; the town house (1360-1381), before which stands a Roland pillar; the wine cellar beneath the town house; and the Peterhof, formerly the residence of the bishops. The chief industries of the town are gloves, cigars, machines, sugar, leather, paper, spirits, etc.; and there are also large workshops for railway repairs. Halberstadt dates from 820, the year in which the see was transplanted from Osterwieck to the site of the town of

Halberstadt. It received town rights in 998; was twice burned down in the 12th century; and was held alternately by the Swedes and Imperialists during the Thirty Years' War. In 1684 it was given to Brandenburg. Pop. about 46,500.

HALDANE, RICHARD BURDON HALDANE, 1st VISCOUNT, a British statesman. He was born in 1856 and was educated at Edinburgh Academy; Edinburgh and Göttingen universities, receiving the M. A. degree, 1st Class Honors in Philosophy, Edinburgh; becoming Gray Scholar and Ferguson Scholar in Philosophy of Four Scottish Universities, 1876. He became also Gifford Lecturer in St. Andrew's University, 1902-1904. In 1885 he was elected to represent Haddingtonshire as a liberal in the House of Commons, continuing to represent the same seat till 1911. During 1905-1912 he was Secretary of State for War, becoming Lord High Chancellor of Great Britain in 1912 and holding the office till 1915. He is a member of the Judicial Committee of Privy Council; LL. D.; Rector of Edinburgh University; and Chancellor of the University of Bristol. He has written much, his works including: "Essays in Philosophical Criticism" (with Professor Seth); "Life of Adam Smith"; "Education and Empire"; "The Pathway to Reality." He translated, with the cooperation of Mr. Kemp, Schopenhauer's "World as Will and Idea."

HALE, EDWARD EVERETT, an American author and Unitarian clergyman; born in Boston, Mass., April 3, 1822. He was graduated at Harvard College in 1839, studied theology and ecclesiastical history privately, was licensed to preach in 1842, and after supplying various congregations was pastor of the Church of the Unity, Worcester, 1846-1856, and was then called to the South Congregational (Unitarian) Church, Boston. During his ministerial career he was active in social, educational, and philanthropic enterprises; organized the Harry Wadsworth Club, which has numerous branches in the United States and Europe, and the Look-Up Legion among American Sunday-schools; edited "The Christian Examiner," "The Sunday-school Gazette," "Old and New" (1869-1875), and "Lend a Hand, a Journal of Organized Charity," besides "Original Documents from the State Paper Office, London, and the British Museum, Illustrating the History of Sir W. Raleigh's First American Colony and the Colony of Jamestown" (1860); John Lingard's "History of England," 13 volumes, and many historical works. He was popular as a lecturer. He is best known as a writer of fiction and history. He died June 10, 1909.

HALE, EUGENE, a United States Senator from Maine, born at Turner, Me., in 1836. He studied law and was admitted to the bar in 1856. He served in the Maine Legislature in 1867, and in the following year was elected to Congress. He was four times re-elected. In 1881 he was elected to the Senate to succeed Hannibal Hamlin, and was re-elected for four successive terms. During the first two years of the administration of President Taft he shared with Senator Aldrich of Rhode Island the majority leadership of the Senate. He was recognized as one of the foremost members of that body. He retired in 1911, after a longer service than that of any other Senator then in office. He died in 1913.

HALE, FREDERICK, United States Senator from Maine; born in Detroit, Mich., 1874; graduated from Harvard in 1896; practiced law in Portland, Me. In 1904 he was elected to the Maine House of Representatives, and from 1912 to 1918 he was a member of the Republican National Committee. He was elected to the United States Senate for the term 1917-1923.

HALE, HARRY CLAY, an American soldier, born in Knoxville, Ill., in 1861. He graduated from the United States Military Academy in 1883 and was appointed 2d lieutenant of the 12th Infantry in the same year. In 1898 he was appointed major to the assistant adjutant-general of volunteers. In the following year he was honorably discharged from the volunteer service, and was transferred to the 15th United States Infantry. He was appointed adjutant-general in 1907. In 1911 he became lieutenant-general and in 1915 he was promoted to be colonel of the 20th Infantry. He was successively brigadier-general and major-general of the National Army in 1917, and was appointed commander of Camp Zachary Taylor. He commanded the 84th Division of the American Expeditionary Force in France in 1918, and was for a short time commander of the 26th Division.

HALE, LOUISE CLOSSER, an American actress and writer, born in Chicago, in 1872. She was educated in the public schools of Indianapolis, and in 1899 married Walter Hale. Her first appearance on the stage was made in Detroit, in 1895. Her published writings include "A Motor Car Divorce" (1906); "The Actress" (1909); "The Married Miss Worth" (1911); "We Discover New

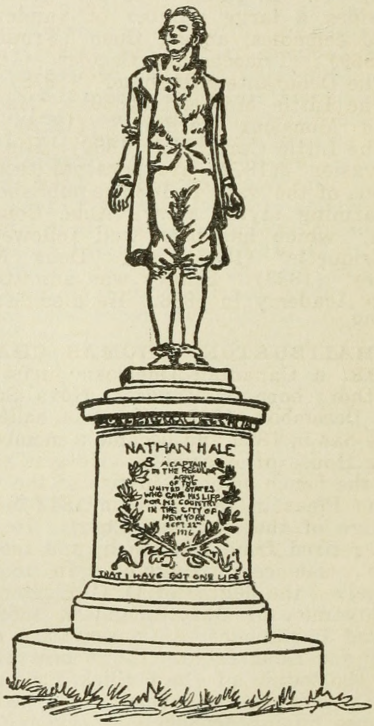
England" (1915); "We Discover the Old Dominion" (1916). She was a frequent contributor to magazines.

HALE, LUCRETIA PEABODY, an American author, sister of E. E. Hale; born in Boston, Mass., Sept. 2, 1820. She published among other works: "The Lord's Supper and Its Observance" (1866); "The Service of Sorrow" (1867); "The Wolf at the Door" in the "No Name Series" (1877); "The Peterkin Papers" (1882); "The Last of the Peterkins" (1886). She also wrote "The New Harry and Lucy" (with E. E. Hale). Her chief fame is as the creator of the Peterkins, who have become popularly recognized types of character. She died in Boston, Mass., June 12, 1900.

HALE, SIR MATTHEW, Lord Chief-justice of England; born in Alderly, Gloucestershire, England, Nov. 1, 1609. Intended for the Church, he was sent to Oxford University in his 16th year. But suddenly he abandoned his studious habits, and joined a company of strolling players. He was on the point of becoming a soldier when induced to adopt the legal profession. Accordingly, in 1629, Hale entered the Society of Lincoln's Inn, and was called to the bar in 1637. In the quarrel between king and Parliament he refrained from identifying himself with either side. When, however, Parliament got the upper hand, he signed the Solemn League and Covenant, sat in the Assembly of Divines at Westminster, tried to bring about a settlement between the king and Parliament, and ultimately taking his engagement to the Commonwealth, was made judge under Cromwell in 1653. He acted as a puisne judge of the Common pleas till Cromwell's death, but refused to have his commission renewed by Richard Cromwell. After the Restoration he was made Chief-Baron of the Court of Exchequer, and 11 years later was transferred to the Chief-justiceship of the Court of King's Bench. He wrote: "History of the Pleas of the Crown" (1736); "History of the Common Law of England" (1713); "Moral and Religious Works," etc. He resigned his office in February, 1676, and died Dec. 25 of the same year.

HALE, NATHAN, an American patriot; born in Coventry, Conn., June 6, 1755. He rose to the rank of captain in the Continental army, and, having volunteered to penetrate the British lines and procure intelligence for Washington, was detected, and executed as a spy in New York City, Sept. 22, 1776. A statue was erected to his memory in New York in 1893.

HALES, STEPHEN, an English philosopher; born in Beckesbourn, Kent, England, Sept. 7, 1677. He entered Corpus Christi College, Cambridge, in 1696, was elected Fellow in 1702, and having taken holy orders was presented, about 1710, to the perpetual curacy of Teddington, in Middlesex. His first important publication was "Vegetable Staticks, or Experiments on the Sap of Vegetables" (1727), which may be regarded as the starting point of our true knowledge of vegetable physiology. In "Hæmastaticks" (1733), a second part of this



NATHAN HALE

work, treating of the circulation of the blood, Hales gives results obtained by experimental methods of investigation like those now in use in studying physiology. Besides other independent works, including "The Means of Dissolving the Stone in the Bladder," he contributed numerous memoirs to the "Philosophical Transactions" on ventilation, electricity, the analysis of air, etc. His ventilating machines were introduced into the London prisons. His improvements in the mode of collecting gases did much to facilitate the subsequent labors of Black, Priestley and Lavoisier. He also invented machines for distilling sea-water,

preserving meat, etc. He died in Teddington, Middlesex, England, Jan. 4, 1761.

HALÉVY, LUDOVIC, a French dramatist; son of Leon; born in Paris, France, Jan. 1, 1834. In 1861 he became secretary to the Corps Legislatif. He first made himself known as the writer of the librettos to Offenbach's burlesques (partly in collaboration with Meilhac); "Orpheus in Hades" (1861); "Beautiful Helen" (1865); "Parisian Life" (1866); "Grand Duchess of Gerolstein" (1867); and "The Brigands" (1870). He wrote besides a large number of vaudevilles and comedies, among them "Froufrou" (1869); "Tricoche and Cacolet" (1872); "The Debutante's Husband" (1878); and "The Little Mother" (1880); "Madame and Monsieur Cardinal" (1873), and "The Little Cardinals" (1880). His "The Invasion" (1872) are personal recollections of the war. In 1882 he published his charming idyllic story "Abbé Constantin," which has been well followed by "Criquette" (1883) and "Deux Mariages" (1883). Halévy was admitted to the Academy in 1886. He died May 8, 1908.

HALIBURTON, THOMAS CHANDLER, a Canadian-American jurist and author; born in Windsor, Nova Scotia, in December, 1796. He was called to the bar in 1820 and became a member of the House of Assembly. He was raised to the bench as chief-justice of the Common Pleas in 1829, and in 1842 became judge of the Supreme Court. In 1856 he retired from the bench, and took up his residence in England. In 1858 he received the degree of D. C. L. from the University of Oxford, and in 1859 entered Parliament as Conservative member for Launceston. He is best known as the author of "Sam Slick," the name of a Yankee clockmaker and peddler, whose quaint drollery has given him a fair chance of immortality. The series of newspaper sketches in which this character had first been introduced was published in 1837 as "The Clockmaker, or Sayings and Doings of Samuel Slick of Slickville"; two later series followed in 1838 and 1840, and "The Attaché, or Sam Slick in England"; in 1843. Haliburton's other works include "A Historical and Statistical Account of Nova Scotia"; "The Old Judge, or Life in a Colony"; "Yankee Stories, and Traits of American Humor"; "Nature and Human Nature"; and "Wise Saws and Modern Instances." He died in Isleworth, near London, England, Aug. 27, 1865.

HALIBUT, or **HOLIBUT**, *Hippoglossus vulgaris*, one of the *Pleuronectidæ* (flat fishes). It is a fish much akin to the turbot. The genuine turbot, *Rhombus maximus*, is, however, a different fish. The halibut is the larger of the two. It sometimes weighs from 300 to 400 pounds.

HALIBUT ISLAND, an island in the North Pacific Ocean, near the S. W. extremity of the peninsula of Alaska; lat. 54° 48′ N., lon. 164° 15′ W. Circumference 22 miles. This island was discovered by Captain Cook, the celebrated navigator, who named it from the immense numbers of halibut taken off its shores.

HALICARNASSUS (-nas′sus) (originally called Zephyria), a Greek city of Caria, Asia Minor, on the Ceramic Gulf. It was founded by Dorian colonists from Trœzen, and defended by several citadels, one of which, Salmacis, was deemed impregnable. Early in its history it became one of the cities of the so-called Dorian Hexapolis, from which confederacy, however, it was eventually excluded. When the Persian power spread W. Halicarnassus readily submitted to the dominion of the conquerors. During this period, however, about 500 B. C., a domestic tyrant Lygdamis, rose to supreme power as a vassal of Persia; and his descendants, without forfeiting the Greek character or ceasing to cultivate the Greek literature and arts, gradually extended their sway over all Caria. Among them was Mausolus, whose wife and sister Artemisia, to commemorate him after his death (353), erected the magnificent MAUSOLEUM (*q. v.*), which was accounted one of the seven wonders of the world. It was under this king that the city attained its highest degree of splendor and prosperity. About 20 years later Alexander the Great destroyed the city by fire; but the inhabitants took refuge in the citadel, which successfully resisted his arms. The city was afterward rebuilt, but it never recovered its ancient importance or prosperity. In the days of the Roman empire it had sunk into comparative insignificance. Halicarnassus was the birthplace of the Greek historians Herodotus and Dionysius. The site of the city is occupied by the modern Budrun.

HALICZ (hä′lich), a town of Poland, in the province of Galicia; on the Dniester, 69 miles S. E. E. of Lemberg. On a hill in the vicinity are the ruins of the once strongly fortified castle of Halicz, built in the 12th century, and the residence of the rulers of what was formerly the grand principality and kingdom of Halicz. From this word the name GALICIA (*q. v.*) is derived. Be-

cause of its strategic position as the key to Lemberg the town was much fought over in the World War (1914-1918). The Russians captured it in August, 1914. The Austrians regained it June 28, 1915. The Russians made an effort that failed to take the town in 1916, but were successful July 1, 1917. These were the last important operations made by the Russians in the World War. On July 22 they abandoned Halicz and began a disorderly retreat.

HALIDON HILL, an eminence about a mile to the N. W. of Berwick, the scene of a disastrous defeat of the Scots by the English, July 19, 1333. Edward III. of England had laid siege to Berwick, the governor of which promised to surrender July 20, if not previously relieved. On July 19, Archibald Douglas, regent of Scotland, led a Scotch army to the relief of the town, and attacked the English at Halidon Hill, but was totally routed with the loss of 10,000 men.

HALIFAX, a municipal and parliamentary borough of England, in York county (West Riding), on the Hebble, 36 miles W. S. W. of York. It is built on a rising slope, and has a very picturesque appearance. The more modern streets are spacious and well paved. Among the principal buildings are the parish church of St. John the Baptist (restored 1879), All Souls' Church, the Square Church, the town hall, market hall, theater, assembly rooms, infirmary, etc. There are several charitable institutions, three public parks, and two grammar schools. Halifax commands abundant supplies of coal and water, and an extensive inland navigation connecting it with Hull and Liverpool. It is one of the centers of the woolen and worsted manufactures in Yorkshire, a great variety of goods being produced. There are also iron, chemical and machine-making works. Pop. about 101,800.

HALIFAX, a city, port of entry, capital of the Province of Nova Scotia, and county-seat of Halifax co., on Halifax Harbor; and on the Intercolonial and the Dominion Atlantic railroads. It is the largest community and only city in the province. The harbor of Halifax is one of the best in the world, 6 miles long, with an average width of a mile, and protected by 11 fortifications. At the N. end of the bay is a narrow channel connecting with Bedford Basin, a sheet of water, 6 miles long, by 4 miles wide, capable of sheltering all the navies of the world. Halifax is the chief British naval station in North America, and in 1901 was the only station on the Atlantic coast occupied by British troops.

Public Interests.—The city is well laid out, the streets are spacious, and cross each other at right angles. Many of the houses are of wood, but many also are handsome brick and stone edifices. The most notable buildings include Government House (official residence of the lieutenant-governor), the Academy of Music, City Hall, the Masonic Temple, Y. M. C. A. Buildings, the Wellington Barracks, Roman Catholic and Church of England Cathedrals, St. Paul's Church (one of the oldest churches in North America), Provincial Building, the Armory, Admiralty House, Military Hospital, Dalhousie College, Free Library, Provincial Hospital, and Court House. The Citadel, a fortress of earth and granite, occupies the summit of the hill commanding the city, is over a mile in circumference, is the strongest fortification in America, and one of the strongest in the world, and the work of many years. The city is lighted by gas and electricity, and is the seat of the see of the Anglican Bishop of Nova Scotia and Prince Edward Island, and of the Roman Catholic Archbishop of Halifax. The Public Gardens, covering some 17 acres, are considered the finest public gardens on the Continent, and the military band concerts given there form one of the chief attractions for visitors to the Maritime Provinces of Canada.

Point Pleasant Park, a handsome natural woods, chiefly of spruce and pine, and the "Dingle," a private natural park of great extent, thrown open to the free use of the public, are among the chief pleasure grounds. The North West Arm, an inlet of the sea, on the W. side of the city, is a charming bay, on the shores of which are many of the villas of the merchants.

Business Interests.—Most of the commerce of the province is carried on in Halifax, and the city has considerable West Indian trade, exporting lumber, fish and agricultural products, and receiving in exchange sugar, rum, molasses and other sub-tropical products. The chief industry of the inhabitants is directed to manufactures, shipbuilding, commerce and fisheries. The principal manufactures are iron castings, machinery, agricultural implements, nails, gunpowder, cordage, leather, boots and shoes, soap and candles, cotton and woolen goods and wooden ware. There are also sugar refineries, distilleries and breweries.

History.—Halifax harbor was originally known as Chedabucto or Chebucto bay, but in 1749 the city was founded on the W. shore by Lord Cornwallis, made the capital of Nova Scotia, then includ-

ing New Brunswick, and named in honor of the Earl of Halifax. It was incorporated as a city in 1842. It is governed by a mayor, elected annually by the citizens, and 4 controllers and 12 councilmen, elected for two years. The city sends two members to the Canadian House of Commons, and three to the Provincial Legislature. Pop. about 46,600. On Dec. 6, 1917, the collision of two munition vessels off the harbor caused an explosion and conflagration that destroyed property over 2½ square miles, and was followed on the next day by a severe blizzard. The catastrophe caused the death of 1,158 persons, while upward of 4,000 were injured and 20,000 were made homeless.

HALL (häl), or **SCHWÄBISCH HALL**, a town of Württemberg, in the deep valley of the Kocher, 33 miles E. by S. of Heilbronn. Like other places in whose names the word Hall or Salz occurs, Hall has considerable saltworks, the brine being obtained from Wilhelmsglück, 5 miles distant. There are also cotton-spinning and weaving, silk and machine manufactures and tanneries. The Gothic church of St. Michael (1427-1525) has excellent wood-carvings. In 1276 Hall was made a free imperial town; it had enjoyed since 1228 the right of minting money; here were coined the first silver *heller* (*häller*) or farthings. In 1802 it was added to Württemberg. Pop. about 10,000.

HALL, CHARLES CUTHBERT, an American educator; born in New York, Sept. 3, 1852; was graduated at Williams College in 1872, and studied theology at the Union Theological Seminary and in London and Edinburgh; was pastor of Presbyterian church till 1897, when he was elected president of Union Theological Seminary. In 1902-1903 he lectured in India and the Far East. Author: "Universal Elements of the Christian Religion" (1902); "Christianity and the Human Race" (1906); "Christ and the Eastern Soul" (1909). He died in 1908.

HALL, CHARLES FRANCIS, an American Arctic explorer; born in Rochester, N. H., in 1821. He was successively a blacksmith, journalist, stationer and engraver, and, becoming interested in the fate of the Franklin expedition, he made two search expeditions, in 1860-1862 and 1864-1869, living alone among the Eskimo, and bringing back some relics and the bones of one of Franklin's company; and in 1871 he sailed in command of the government ship "Polaris," on an "expedition to the North Pole." He took his vessel for 250 miles up the channel leading from Smith's Sound, and on Aug. 29 reached 82° 16′ N.—at that date the highest N. latitude ever reached; then turning he went into winter-quarters at Thank God Harbor, Greenland (81° 38′ N.). Here, on his return from a sledge expedition to the N., he was taken suddenly ill, and died Nov. 8, 1871; over his grave a grateful epitaph was placed by the British polar expedition in 1876. Among the valuable results of Hall's work were the exploration of the West Greenland channel, and the extension of Greenland and Grinnell Land 1½° N. Hall published "Arctic Researches, and Life Among the Esquimaux" (1864); and from his papers largely was compiled the "Narrative of the Second Arctic Expedition" (1879).

HALL, GRANVILLE STANLEY, an American educator, born at Ashfield, Mass., in 1846. He graduated from Williams College in 1867, and studied at the Union Theological Seminary in the following year. He then took post-graduate courses in Germany and in London. From 1872 to 1876 he was professor of psychology at Antioch College, and was instructor in English at Harvard in 1876-7. From 1881 to 1888 he was professor of psychology at Johns Hopkins University. In the latter year he was president and professor of psychology at Clark University. He was editor of several psychological magazines and was a member of many learned societies. He wrote "Aspects of German Culture" (1881); "Adolescence" (1904); "Educational Problems" (1911); "Founders of Modern Psychology" (1912); "Jesus the Christ, in the Light of Psychology" (1917); and "Psychology" (1917).

HALL, LYMAN, one of the signers of the Declaration of Independence; born in Connecticut, about 1731. He was graduated at Yale College in 1747, commenced the study of medicine at Sunbury, Ga., in 1752, represented the latter State in Congress 1775-1780, was appointed governor of his State in 1783, and died in 1791.

HALL, ROBERT, an English clergyman; born in Arnsby, Leicestershire, England, in 1764. He studied at the Baptist College at Bristol, and afterward at Aberdeen. In 1783 he became assistant pastor of Broadmead Church in Bristol, suffered for a time from mental alienation, recovered and became pastor of the Baptist Church at Cambridge, where he soon acquired a great reputation by his preaching and his writings, such as "Apology for the Freedom of the Press" (1793); "Modern Infidel-

ity" (1800); "Reflections on War" (1802). He again became insane and resigned his charge, but recovering married and settled at Leicester in 1808, till in 1820 he was again called to Bristol. He died in 1831.

HALLAM, HENRY, an English historian; born in Windsor, England, July 9, 1777. His father was dean of Bristol. After studying at Eton he was sent to the University of Oxford, where he distinguished himself by his classical attainments. He afterward settled in London, and entered on his career of literary labor as one of the first contributors to the "Edinburgh Review." His "View of the State of Europe during the Middle Ages" (1818) was the first great result of his studies and researches. His masterly work on the "Constitutional History of England" was given to the world in 1827. Hallam belonged to the Whig party in politics, but he wrote with an impartiality which is rarely rivaled. In 1833 a very heavy blow fell on him in the death of his eldest son, a young man of high promise, and the chosen friend of Alfred Tennyson, whose love and sorrow are recorded in "In Memoriam." The next great work of Hallam, published in 1837-1839, was his "Introduction to the Literature of Europe in the 15th, 16th, and 17th Centuries." After losing his daughter, his wife, and his second son (the last in 1850), the aged and mourning father himself died in Penhurst, Kent, England, Jan. 21, 1859.

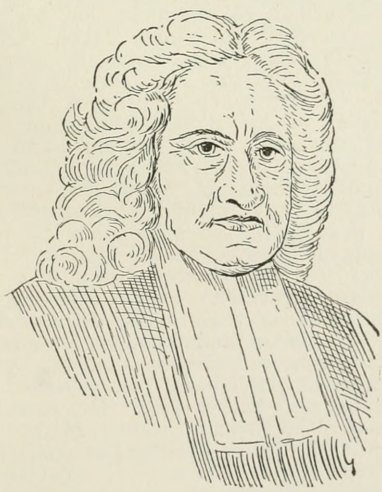
HALLE (häl'le), a city of Prussian Saxony, known as Halle an der Saale, to distinguish it from other places of the same name in Germany; on the right bank of the Saale and on several small islands of the river; 20 miles N. W. of Leipsic. As an important railway center, Halle has rapidly increased in size, industry, and prosperity. Its famous university was founded in 1694 by Frederick I. of Prussia; after having been suppressed by Napoleon in 1806, and again in 1813, it was re-established in 1815 and incorporated with the University of Wittenberg, which had been dissolved during the war. The Francke Institutions rank among the most important establishments of the place. The noteworthy buildings and institutions embrace St. Mary's Church (1529-1554); the Gothic church of St. Maurice, dating from the 12th century, with fine woodcarvings and sculptures; the red tower, 276 feet high, in the market-place, with a Roland statue in front of it; the townhall; the remains of the Moritzburg, built in 1484, the ancient residence of the archbishops of Magdeburg; a deaconesses' home; a large penitentiary; the medical institutes and clinical hospitals; the agricultural institute; the university library (220,000 vols.); a provincial museum; an art collection; and an archæological and other museums. The most important industrial product of Halle is salt, obtained from brine springs within and near the town, which have been worked from before the 7th century. The industries next in importance prior to the World War, were sugar-refining, printing, brewing, the manufacture of mineral oil, and fruit cultivation. A very active trade was carried on in machines, raw sugar, mineral oil, grain, and flour. Halle is the birthplace of Handel, the composer. Originally a border fortress against the Slavs, it became in the 10th century an appanage of the Archbishop of Magdeburg, and by the 12th century was famous as a commercial city. In that and the 13th century Halle was a powerful member of the Hanseatic League, and successfully withstood a fierce siege by the Archbishop of Magdeburg in 1435, but finally fell into his hands in 1478. Terribly impoverished during the Thirty Years' War, it was incorporated with Brandenburg at the peace of Westphalia. Pop. about 180,000.

HALLECK, FITZ-GREENE, an American poet; born in Guilford, Conn., July 8, 1790. By his mother he was descended from John Eliot, "the apostle of the Indians." He became a clerk in a bank in New York in 1811, and in 1832 the private secretary of John Jacob Astor; in 1849 he retired, on an annuity of $200 left him by Astor, to his native town, where he spent the remainder of his days. From his boyhood Halleck wrote verses, and in 1819 he contributed, with Joseph Rodman Drake, a series of humorous satirical papers in verse to the New York "Evening Post." In the same year he published his longest poem, "Fanny" (2d edition, enlarged, 1821), a satire on the literature, fashions, and politics of the time. He visited Europe in 1822, and in 1827 published anonymously an edition of his poems (3d edition, enlarged, 1845). In 1865 he published "Young America," a poem of 300 lines. His complete "Poetical Writings" was published in 1869. He died in Guilford, Conn., Nov. 19, 1867.

HALLECK, HENRY WAGER, an American military officer; born in Westernville, N. Y., Jan. 16, 1815. He was graduated at the United States Military Academy in 1839. During the Mexican War he was employed in the operations on the Pacific coast, and for services was

breveted captain in 1847. He took a leading part in organizing the State of California, became captain of engineers in 1853, left the service in 1854, and for some time practiced law in San Francisco. On the outbreak of the Civil War he re-entered the army, and in November, 1861, was appointed Commander of the Department of the Missouri, which in a few weeks he reduced to order. In March, 1862, the Confederate first line had been carried from end to end, and Halleck's command was extended so as to embrace, under the name of the Department of the Mississippi, the vast stretch of territory between the Rocky Mountains and the Alleghenies. His services in the field ended with the capture of Corinth, with its 15 miles of intrenchments, in May, 1862. In July he became General-in-Chief of the armies of the United States; and henceforth he directed from Washington the movements of the generals in the field, till, in March, 1864, he was superseded by General Grant. Halleck was chief of staff till 1865, commanded the Military Division of the Pacific till 1869, and that of the South till his death, Jan. 9, 1872. His "Elements of Military Art and Science" (1846; new edition 1861) was much used during the Civil War; and he also published books on mining laws, etc.

HALLEY, EDMUND, an English astronomer and mathematician; born in Haggerston, near London, England, Oct.



EDMUND HALLEY

29, 1656. He received his education at St. Paul's School, and Queen's College, Oxford, where he attained so great a proficiency in mathematical studies, that in 1676 he published observations on a spot in the sun, by which the motions of that body on its axis were determined. The same year he went to St. Helena, where he determined the positions of 350 stars. In 1680 he made the tour of Europe with Mr. Nelson; and on the passage to Calais was the first to observe the great comet—the same which visited the Western hemisphere again in 1835 (see COMET). After his return, he gave his attention to the theory of the planetary motions, which made him acquainted with Sir Isaac Newton, who intrusted to him the publication of his "Principia." To ascertain exactly the cause of the variation of the compass, he made several trips to the Western Ocean. In 1703 he was appointed Savilian Professor of Geometry at Oxford; in 1705 he made public his valuable researches on the orbits of comets; in 1713 he became secretary to the Royal Society; and in 1719 he succeeded Flamsteed as Astronomer Royal. The remainder of his life was chiefly spent in completing the theory of the motion of the moon. His principal works are: "Catalogue of the Southern Stars," "Astronomical Tables," "An Abridgment of the History of Comets," etc. He died in 1742.

HALLIWELL-PHILLIPPS, JAMES ORCHARD, an English Shakespearean scholar and antiquary; born in Chelsea, London, June 21, 1820; the son of Thomas Halliwell. He was educated at Jesus College, Cambridge. His studies embraced the whole field of earlier English literature, plays, ballads, popular rhymes and folklore, chap-books, and English dialects, and its fruits remain in the publications of the old Shakespeare and Percy societies. In 1839 he was elected Fellow of the Royal and Antiquarian societies. Gradually he came to concentrate himself on Shakespeare alone and more particularly on the facts of his life, the successive editions of his "Outlines of the Life of Shakespeare" (1848; 8th ed. 1889) recording the growing results of his discoveries. In 1872 he took over the management of the property his wife (died 1879) inherited from her father, Thomas Phillipps, and assumed his father-in-law's name. Apart from Shakespeare, his "Nursery Rhymes and Nursery Tales of England" (1845) and "Dictionary of Archaic and Provincial Words" (1847; 6th ed. 1868) will keep his name from being forgotten. His magnificent edition in folio of the "Works of Shakespeare" (16 vols. 1853-1865) was published at a price prohibitive to most students. He died in Hollingbury Copse, near Brighton, England, Jan. 3, 1889.

HALLOWE'EN, the name popularly given to the eve or vigil of All Hallows, or festival of All Saints, which being Nov. 1, Hallowe'en is the evening of Oct. 31. In England and Scotland it was long consecrated to harmless fireside revelries, with many ceremonies for divining a future sweetheart.

HALLUE (ä-lü'), a French river, noted for the battle on its banks in 1870 between the French and Germans.

HALO, PARHELION, or **CORONA**, various meteorological phenomena. For corona as a solar phenomenon, see under SUN.

HALOGEN, the electro-negative radical of a haloid salt. This term is also used for the monad elements chlorine, bromine, iodine, and fluorine, as their sodium salts resemble sea salt, which is chloride of sodium, NaCl. Chloride is a gas, bromine a liquid, and iodine a solid at ordinary temperatures. Chlorine has the greatest chemical affinity for hydrogen, and iodine for oxygen, that of bromine being intermediate.

HALPINE, CHARLES GRAHAM (pseudonym) MILES O'REILLY, an Irish-American author; born in Ireland in November, 1829. He came to the United States at 23 and became a New York journalist. He served through the Civil War, attaining the rank of colonel. His writings include: "Lyrics"; "Poems"; "Miles O'Reilly Papers"; "Life and Adventures of Private Miles O'Reilly"; "Baked Meats of the Funeral"; "Poetical Works"; etc. He died in New York City, Aug. 3, 1868.

HALS, FRANS (häls), the Elder, a Dutch portrait and genre painter; born probably in Antwerp, in 1580 or 1581. He studied under Karel van Mander and, according to some accounts, under Rubens. Hals is usually regarded as the founder of the Dutch school of genre-painting. Of his portrait groups eight noble examples are preserved in the museum of Haarlem. The "Mandoline Player" (1630), in the gallery of Amsterdam, is a typical example of his treatment of single figures. As a teacher he exercised a marked influence on the development of Dutch art, Jan Verspronck, Van der Helst, Adrian van Ostade, Adrian Brouwer, and Wouwerman having been his pupils. A replica of his "Hille Bobbe" (Berlin Gallery) is in the N. Y. Metropolitian Museum of Art. He died in Haarlem, Netherlands, in August, 1666.

His brother, DIRK HALS (before 1600-1656), a pupil of Abraham Bloemaert, was also an excellent genre painter; and several of Frans' sons were artists, the most celebrated being Frans Hals, the Younger, who flourished from about 1637 to 1669.

HALSEY, FRANCIS WHITING, an American editor and author, born in Unadilla, N. Y., 1851; died in New York City, 1919. Shortly after finishing his education at Cornell, he joined the staff of the New York "Tribune," in 1875. Five years later he went over to the New York "Times," becoming editor of the "Times Saturday Review," continuing as such until 1902. Shortly before his death he completed a compiled "History of the World War," in ten volumes. Among his original writings are, "Our Literary Deluge" (1902); "The Pioneers of Unadilla Village" (1902); a historical and biographical introduction to Mrs. Rowson's "Charlotte Temple" (1905). Among his editorial achievements are; "American Authors and Their Homes" (1901); "The World's Famous Orations" (in association with Wm. J. Bryan (1906); and "Seeing Europe with Famous Authors" (10 vols., 1914).

HALSTEAD, MURAT, an American journalist; born in Ross, Butler co., O., Sept. 2, 1829. He spent his minority on a farm. At 18 he began writing for newspapers. In 1851 he finished his schooling at Farmers' College, near Cincinnati, and then decided to study law. He did local newspaper reporting on several Cincinnati papers; in 1853 became manager of a department on the Cincinnati "Commercial," and subsequently part owner. In 1866 it was considered one of the most potent newspapers in the West. In 1890 he removed to Brooklyn, N. Y., and edited the "Union" newspaper. He wrote: "The Story of Cuba"; "Life of William McKinley"; "The Story of the Philippines"; "History of American Expansion"; "Life of Admiral Dewey"; "The Boer and British War"; etc. He died July 2, 1908.

HAM (Hebrew, burnt, swarthy, black), a son of Noah. The impiety revealed in his conduct toward his father drew on him, or, rather, according to the Bible statement, on his son Canaan, a prophetic malediction (Gen. ix: 20-27). Ham was the father of Cush, Mizraim, Phut, and Canaan, that is the ancestor of the Canaanites, southern Arabians, Ethiopians, Egyptians, and the Africans in general (Gen. x: 6-20).

HAM (äm), a town in France, department of Somme, on the river of that name, 12 miles S. W. of St. Quentin. Its ancient fortress or castle was rebuilt by the Comte de Saint Pol in 1470. and now

is used as a state prison. It is memorable as the place of confinement of Joan of Arc, Moncey, and others; of Polignac, Peyronnet, and Guernon de Ranville from 1831 to 1836; of Louis Napoleon from 1840 till 1846; and after the coup d'état, of the republican generals Cavaignac, Lamoricière, Changarnier, etc.

HAM, WEST, a suburb of East London, and a parliamentary and county borough of Essex, England, on the Thames, opposite Greenwich. Pop. 133,500. It is a busy industrial parish, and has silk printing, ship-building, distilling, and chemical manufactures.

HAMADAN (hä-mä-dän'), a town of Persia, in the province of Irak Ajemi, situated at the N. base of Mount Elwend, 160 miles W. S. W. of Teheran. It contains Avicenna's tomb, and others affirmed to be those of Mordecai and Esther. Being the center of converging routes from Bagdad, Erivan, Teheran, and Ispahan, it is the seat of a large transit trade; and it carries on extensive manufactures of leather, and in a less degree of coarse carpets and woolen and cotton fabrics. Hamadan is generally believed to occupy the site of the Median ECBATANA (*q. v.*). Pop. between 30,000 and 40,000.

HAMAN (hā'man), a favorite of Ahasuerus, King of Persia. In order to revenge himself on Mordecai the Jew, he plotted the extermination of all the Jews in the kingdom; but in the providence of God he was thwarted by Esther, fell into disgrace with the king, and wrought his own ruin and the upbuilding of the Jews, B. C. about 485.

HAMBOURG, MARK, a Russian pianist and composer. He was born at Bogutchar, south Russia, in 1879, and was educated by his father and subsequently by Professor Leschetitzky, Vienna, where he obtained the Liszt scholarship in 1894. He made his first public appearance in Moscow in 1888, and later appeared in London, Vienna, Australia, Paris, Berlin. He made his first American tour during 1899-1900, and the second American tour during 1902-1903. He toured Australia and New Zealand in 1903, south Africa in 1905, Holland in 1906, returning in subsequent years. He made his first Canadian tour in 1910. His publications include: "Variations on a Theme by Paganini"; "Volkslied"; "Espièglerie"; "Romance."

HAMBURG (häm'börg), a city of Germany, one of the three formerly independent Hansa towns, and the greatest commercial port on the continent of Europe; 80 miles from the North Sea, on the N. branch of the Elbe. The town of Altona adjoins it on the W. From the Elbe proceed canals which intersect the E. and lower part of the city in all directions, and it is also intersected by the Alster, which here forms two fine streams, the Binnenalster and Aussenalster. The quays and harbor accommodation are very extensive. After the destructive fire of 1842 whole streets were rebuilt in a magnificent and expensive style. The most important public buildings are the church of St. Nicholas, a noble Gothic structure with a lofty tower and spire, built between 1845 and 1874; St. Peter's, another lofty Gothic edifice; St. Michael's, the largest of the churches; St. Catharine's, an ancient edifice; St. James', erected in 1354, but surmounted by a modern tower; an elegant Jewish temple; an exchange, a noble edifice, consisting chiefly of a magnificent hall, surrounded by a fine colonnade. There are also the Johanneum institution, containing an ancient college, museums, and the city library, with about 300,000 volumes; several well-endowed hospitals; zoölogical and botanic gardens; the Kunsthalle, a large collection of pictures and sculpture, theaters, etc. Hamburg was prior to the World War of most importance on account of its great shipping trade and the business of banking, exchange, marine assurance, etc., carried on in connection with that. It was the first commercial city on the continent of Europe, and ranked only below London and New York in the value of its trade. Its manufactures, though large, are less important, including shipbuilding, tobacco and cigar making, iron-founding, brewing, etc. The city owes its foundation to the emperor Charlemagne, who (808-811) built a citadel and a church on the heights between the Elbe and the E. bank of the Alster, as a bulwark against the neighboring pagans. It became important as a commercial city in the 12th century, and in the 13th it combined with Lübeck in forming the Hanseatic League. In 1618 Hamburg was formally acknowledged a free city of the Empire. During the Thirty Years' War its population and prosperity continued to increase on account of the immunity of its position, and in the following century it obtained a large share of the trade with North America. In 1810 it was formally incorporated in the French empire along with the N. W. part of Germany. In 1815 it joined the Germanic Confederation as a free city. In 1888 the city was included in the Zollverein or German Customs Union. In the World War (1914-1918) Ham-

burg, which lived by its shipping interests, suffered heavily owing to the blockade. Vessels rotted in the docks and desolation marked the once flourishing port. Since the Peace of 1919 Hamburg is fast regaining her old supremacy among German ports.

HAMELN (hä'meln), a town and formerly a fortress of Hanover, Prussia, on the Weser; 25 miles S. W. of Hanover. It presents a mediæval appearance, having many houses and buildings surviving from the Gothic and Renaissance periods of architecture. The chain bridge which here crosses the Weser was completed in 1839, and is about 840 feet in length. The chief employments of the people are machine making, iron founding, wool spinning, fish breeding, brewing, and the manufacture of leather, paper, artificial manure, and chemicals. In the earliest times Hameln belonged to the Abbey of Fulda, and was a member of the Hanseatic Confederation. It suffered severely during the Thirty Years' War. With this town is connected the well-known legend of the Piper (or Ratcatcher) of Hameln, who in 1284 freed the town from rats through the mystic charm of his pipe. Pop. about 22,000.

HAMERTON, PHILIP GILBERT, an English writer on art; born in Laneside, Lancashire, England, Sept. 10, 1834. He commenced his career as an art-critic by contributing to the "Fine Arts Quarterly," the "Fortnightly" and the "Saturday Review." He produced a volume of poems on "The Isles of Loch Awe" (1855), and "A Painter's Camp in the Highlands, and Thoughts About Art" (1862). In 1868 he published "Etching and Etchers" and "Contemporary French Painters," and a continuation, "Painting in France After the Decline of Classicism." After 1869 he edited the "Portfolio," an art journal. Other publications are: "The Intellectual Life" (1873); "Human Intercourse" (1884); "The Graphic Arts" (1882); "Landscape" (1885); "Portfolio Papers" (1889); "French and English" (1889), and a couple of novels. He died Nov. 6, 1894.

HAMES, an old Lincolnshire, England, name for a flail, an instrument for threshing or beating grain from the ear by hand. The old saying, "to set the thames on fire," takes its origin from this word, and has nothing whatever to do with the river Thames.

HAMILCAR (ha-mil'kär), the name of several Cathaginian generals, of whom the most celebrated was Hamilcar, surnamed Barca (the lightning), the father of the great Hannibal. While quite a young man he was appointed to the command of the Carthaginian forces in Sicily, in the 18th year of the first Punic War, 247 B. C., when the Romans were masters of almost the whole island. For two years he defied all the efforts of the Romans to dislodge him; but the Carthaginian admiral, Hanno, having been totally defeated off the Ægates, 241 B. C., he reluctantly consented to evacuate Sicily. A revolt of the returned troops, joined by the native Africans, was successfully repressed by Hamilcar. He then entered on a series of campaigns in Spain, where he founded a new empire for Carthage. Here he passed nine years, and had brought the whole southern and eastern part of the country under Carthaginian rule when he was slain in battle against the Vettones, 229 B. C. His great design of making Spain a point of attack against Rome was ably carried out by his son Hannibal.

HAMILTON, a town in the Bermudas, of which it is the capital. It is on the Great Bermuda, and was founded in 1790. Pop. (1918) 2,627.

HAMILTON, a city and county-seat of Butler co., O.; on both sides of the Great Miami river and on the Miami and Erie canal, the Pittsburgh, Cincinnati, Chicago and St. Louis, and the Cincinnati, Hamilton and Dayton and the Ohio Electric railroads; 25 miles N. of Cincinnati. The river affords extensive water power for the manufacture of railroad supplies, machinery, wagons and carriages, boots and shoes, flour, iron, bank-vaults, ropes, saws, etc., besides paper, woolen, cotton, and sawmills. The city has 2 National banks, and its institutions include Notre Dame Academy, the Hamilton Children's Home, the Mercy Hospital, a court house, public schools, electric lights, and street railways, daily and weekly newspapers, and public high school. Pop. (1910) 35,279; (1920) 39,675.

HAMILTON, a city of Ontario, Canada, the capital of Wentworth co. It is on the Burlington Bay, and on the Grand Trunk, the Canadian Pacific, and the Toronto, Hamilton and Buffalo railroads. It has an excellent harbor and has steam communication with lake ports, and an important trade with the Maritime Provinces. It is the center of an important fruit growing region of west Ontario. Abundant water power is furnished from the Decew Falls, 35 miles southeast of the city. It is also supplied with natural gas from the Wel-

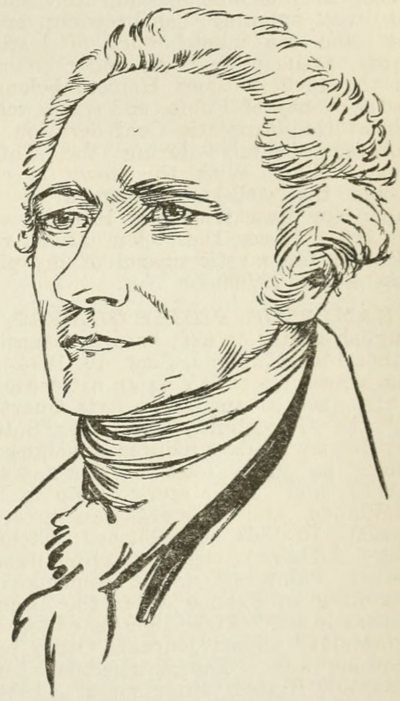
land field. It has over 500 manufacturing establishments, 33 banks and branches, over 80 churches, and many public and private institutions. Pop. (1918) about 110,000.

HAMILTON, a town of Lanarkshire, Scotland, on the Clyde; 10 miles S. E. of Glasgow. The principal edifice is the burgh building (1863), with a clock-tower nearly 130 feet high; and there are also the county buildings, large barracks, and a good race-course. The former manufactures of lace, tamboured bobinette, and cambric have declined; and mining is now the chief industry of the district. Hamilton was made a royal burgh in 1548, and one of the five Falkirk parliamentary burghs in 1832. Hamilton Palace, successor to Cadzow Castle, is the seat of the Duke of Hamilton. Dating partly from 1594, but greatly enlarged in 1705 and 1822, it is a sumptuous classical structure, though its choicest art collections were sold in 1882 for nearly $2,000,000. Within its policies are a superb mausoleum (1852), the ruins of Cadzow Castle, the herd of wild white cattle, and some primeval oaks. Pop. about 39,531.

HAMILTON, metropolis of the W. part of Victoria, Australia, on Grange Burn Creek, 224 miles W. of Melbourne. Two pastoral and agricultural exhibitions are held here annually, and two race-meetings. Pop. (1918) 4,700.

HAMILTON, FAMILY OF, a family long connected with Scotland, though probably of English origin, the name being evidently territorial. The first person of the name in Scotland of whom we have reliable information was WALTER FITZ-GILBERT OF HAMILTON, who, in 1296, swore fealty to Edward I. of England. In 1445 the family was ennobled in the person of SIR JAMES HAMILTON of Cadzow, who was created Lord Hamilton of Cadzow. At first he adhered to the Douglases against the crown; but, deserting them opportunely, he was rewarded by large grants of their forfeited lands, and at a later period by the hand of the Princess Mary, eldest daughter of King James II., and widow of Thomas Boyd, Earl of Arran. He died in 1479. JAMES, the 3d Marquis of Hamilton, one of the ablest and most distinguished of the family, created Duke of Hamilton in 1643 by Charles I., was taken prisoner by the parliamentary forces soon after the battle of Preston, and beheaded in March, 1649. WILLIAM ALEXANDER LOUIS STEPHEN DOUGLAS HAMILTON, 12th Duke of Hamilton in the peerage of Scotland, and 9th Duke of Brandon in the peerage of Great Britain, is premier peer of Scotland, and hereditary keeper of Holyrood House. The ennobled offshoots of the main branch of the Hamiltons are numerous and distinguished. Among these are the Dukes of Abercorn, the Earls of Selkirk, Orkney, and Haddington, and the Viscounts Boyne.

HAMILTON, ALEXANDER, an American statesman; born in Nevis, W. I., Jan. 11, 1757. In 1772 he was sent to Elizabethtown, N. J., to a grammar school, and in 1773 entered King's College (now Columbia University). When the Revolution broke out he was appointed (1776) captain of artillery, and in 1777 was made a member of Washington's staff, with the rank of lieutenant-



ALEXANDER HAMILTON

colonel. In 1780 he married a daughter of General Schuyler. Being reproved by Washington for some slight matter, he resigned his commission, but the next year was in command of a battalion of infantry, engaging in the battle of Yorktown. The war being ended he studied law, and was sent to Congress in 1782, and again in 1787. He served in the convention that framed the National Constitution, where he led the sentiment in favor of a strong Federal government, as against a mere union of States. He wrote the greater number of papers collected in "The Federalist," that exerted

great influence in bringing the States to accept the Constitution, and became the leader of the Federalist party. He was made the first Secretary of the Treasury under Washington. He was by this time ranked with Washington, Jefferson, and Franklin, as one of the four great Americans of his day. His position as the leader of the Federalist party brought him into conflict with Jefferson and Monroe, but he nevertheless supported Jefferson in the election contest between him and Burr in the House of Representatives, and partly by his influence Burr was defeated. He became inspector-general of the army in 1798. He was one of the founders of the Society of the Cincinnati, of which, in 1800, he became President-General. In 1804 he exerted his influence to defeat Aaron Burr, who was a candidate for governor of New York. Burr challenged Hamilton to a duel, in which he was mortally wounded by Burr's first fire, and died the following day, July 11, 1804.

HAMILTON, COSMO, an English dramatist and novelist. His first apprenticeship was in journalism, and after holding various positions became editor of the "London World." When the war broke out he was gazetted as sub-lieutenant, R. N. A. S. His works include: Novels—"Adam's Clay"; "Brummell"; "The Blindness of Virtue"; "Duke's Son"; "The Miracle of Love"; plays—"The Wisdom of Folly"; "A Sense of Humor"; "The Mountain Climber"; "Bridge"; "Arsene Lupin"; "Mrs. Skeffington"; "The Blindness of Virtue."

HAMILTON, LADY EMMA, born AMY LYON, an English adventuress; born probably in Ness, Cheshire, England, April 26, 1763. She had had three places in London, had borne two children to a navy captain and a baronet, and had posed as Hygeia in a quack-doctor's "Temple of Health," when in 1782 she accepted the protection of the Hon. Charles Greville (1749-1809), to exchange it in 1786 for that of his uncle, Sir William Hamilton (1730-1803). After five years at Naples, in 1791 she was married at Marylebone Church to her elderly ambassador, and, returning to Italy, was straightway admitted to the closest intimacy by Maria Caroline, the queen of Ferdinand I. Her "eminent services" to the British fleet during 1796-1798 in furnishing information and procuring supplies were extolled by Lord Nelson and vaunted by herself. Nelson had first met her in 1793; and gradually Platonic friendship ripened to guilty passion, till, four months after the trio's return to England, she gave birth to a daughter (1801-1881), "our beloved Horatia," so Nelson writes of her in a holograph letter to "my own dear Wife, in my eyes and the face of Heaven." Her credulous husband's death, followed four years later by Nelson's, left Emma mistress of $10,000 a year; but by 1808 she was owing $90,000, and in 1813 was arrested for debt. Next year she escaped to Calais, where she died in penury, Jan. 15, 1815.

HAMILTON, FRANK HASTINGS, an American surgeon; born in Wilmington, Vt., Sept. 10, 1813. He was graduated from the medical department of the University of Pennsylvania in 1833, and first practiced in Auburn, N. Y. In 1844 he went to Buffalo, and, with Dr. Austin Flint and Dr. James Platt White, established the medical department of the University of Buffalo. He removed to Brooklyn in 1860, and was the first Professor of Surgery in the Long Island College Hospital. In 1861 he went to the war as surgeon of the 31st New York Volunteers and was made brigade surgeon after the battle of Bull Run, and surgeon of General Keyes' corps in 1862. A year later he was made medical inspector of the United States army. He was one of the founders of Bellevue Hospital Medical College in 1861, and was Professor of Surgery there till he resigned in 1875. Dr. Hamilton was associated with Drs. Agnew and Bliss in the care of President Garfield. He wrote extensively on the principles and practice of surgery. He died in New York City, Aug. 11, 1886.

HAMILTON, SIR IAN STANDISH MONTEITH, an English soldier, born in Corfu, in 1853. He was educated at Wellington and entered the army in 1873. He saw active service in the Afghan War in 1878 to 1880, and in the Boer War of 1881. He took part in the Nile expedition of 1884-1885, and in the Burmese expedition of 1886-1887. He was promoted to be colonel in 1891, and general in 1899, when he fought before Ladysmith. In 1901 he was appointed chief of staff to General Kitchener. From 1910 to 1915 he was chief in command of the Mediterranean Expeditionary Force, and had general charge of the land operations at the Gallipoli peninsula. The failure of his enterprise resulted in severe criticism against his plan of campaign. He defended himself in an elaborate report, made public in 1918.

HAMILTON, PATRICK, usually considered as the first Scotch reformer, the second son of Sir Patrick Hamilton of Kincavel and Stanehouse, and of Cath-

erine, daughter of the Duke of Albany, second son of James II.; born probably in Glasgow, in 1504. He was educated partly at St. Andrews and partly at Paris, where he took his degree in 1520. While still a boy he had been appointed Abbot of Fearn, in Rosshire, but never went into residence, settling instead at St. Andrews in 1523. Here he began to announce his convictions in the principles of the Reformation, and was summoned in 1526 by Archbishop Beaton to stand his trial for heresy. He fled to Germany, where his education as a reformer was completed by an intimate acquaintance with Luther and Melanchthon. After six months' absence he returned to Scotland, and began to preach the Gospel openly at Linlithgow, but was allured by Beaton to St. Andrews under pretense of a friendly conference, put on his trial, convicted of various heresies, and burned at the stake, March 1, 1527. His death did perhaps more to extend the principles of the Reformation in Scotland than even his life could have done.

HAMILTON, SIR WILLIAM, a distinguished Scotch metaphysician; born in Glasgow, Scotland, March 8, 1788. His father and grandfather held in succession the chairs of anatomy and botany in Glasgow University. Having studied with distinction at Glasgow, in 1809, he entered Baliol College, Oxford, where he gained first-class honors. In 1813 he was admitted to the Scottish bar, but never acquired a practice in his profession, his taste lying much more toward the study of philosophy. In 1820 he became a candidate for the chair of moral philosophy in Edinburgh, but, being defeated by Prof. John Wilson, he took the chair of universal history. In 1829 the publication in the "Edinburgh Review" of his celebrated critique of Cousin's system of philosophy gave him at once a first place among the philosophical writers of the time. This was followed in 1830 by his criticism of Brown, and in 1831 by his article on the authorship of "Letters of Obscure Men." In 1836 he was appointed to the chair of logic and metaphysics in Edinburgh University. In 1846 he published an annotated edition of the works of Thomas Reid, and in 1854 the first volume of a similar edition of the works of Dugald Stewart. His lectures on logic and metaphysics were collected and edited by Dean Mansel and Professor Veitch. Hamilton's most important contributions to philosophy are connected with his doctrine of the Quantification of the Predicate in his system of logic; his theory of the "relativity of knowledge," in the Kantian sense, held along with an apparently incompatible doctrine of immediate perception of the non-ego; and his definition of the infinite or unconditioned as a mere negation of thought. He died in Edinburgh, Scotland, May 6, 1856.

HAMILTON COLLEGE, an educational non-sectarian institution in Clinton, N. Y., founded in 1812; reported at the close of 1919: Professors and instructors, 27; students, 298; volumes in the library, 84,000; productive funds, $1,478,000; income, $177,883; president, Frederick Carlos Ferry, Ph. D.; Sc. D., LL. D.

HAMLET, the hero of Shakespeare's greatest tragedy, but without a figure originally historical, mythological, or partly both, still remains uncertain. The legend of Amleth is first found in the 3d and 4th books of the Latin history of Denmark by Saxo Grammaticus, written about the end of the 12th century, but first printed at Paris in 1514. The story of Hamlet was freely translated in the fifth volume of François de Belleforest's "Tragic Histories" (1570), and a rough but literal English translation of this exists in a single copy (once Edward Capell's) in the library of Trinity College, Cambridge, entitled "The Hystorie of Hamblet" (London, 1608; reprinted in Collier's "Shakespeare Library," 1841).

HAMLIN, ALFRED DWIGHT FOSTER, an American architect, born in Constantinople, Turkey, in 1855, son of Cyrus Hamlin, founder and president of Robert College. He graduated from Amherst College in 1875 and studied architecture in the United States and in Paris. In 1883 he was appointed special assistant of architecture in Columbia University, and became successively instructor, assistant professor of architecture, adjunct professor, and full professor in that institution. He was a member of several architectural societies. He was the author of "A History of Architecture" (1896); "History of Ornament, Ancient and Medieval" (1916); and was a frequent contributor to architectural periodicals, and to various dictionaries and encyclopedias.

HAMLIN, CYRUS, an American missionary; born in Waterford, Me., Jan. 5, 1811; was graduated at Bowdoin College in 1834 and at Bangor Theological Seminary in 1837; went to Turkey in the following year. From 1860 to 1876 he was president of Robert College, which he had founded after a long conflict with the Turkish Government. President Hamlin belonged to the group of American educators in the Levant whose

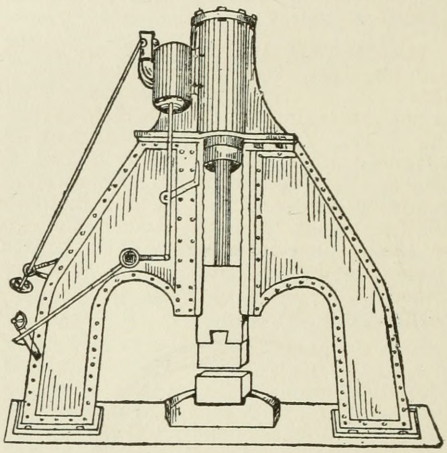
influence did much in molding the character of modern Bulgarian leaders, and producing autonomy for Bulgaria. He returned to the United States and became a professor in the Theological Seminary in Bangor; was president of Middlebury College, Vt., in 1880-1885, when he removed to Lexington, Mass. Part of his works are in the Armenian language; those in English include "Among the Turks" (1877) and "My Life and Times" (1893). He died in 1900.

HAMLIN, HANNIBAL, an American statesman; born in Paris, Me., Aug. 27, 1809; was admitted to the bar in 1833; and began practice in Hampden; was elected to the United States Senate in 1848 to fill an unexpired term; re-elected in 1851 and again in 1857; resigned in 1861, after being elected Vice-President on the ticket with Abraham Lincoln; was again a United States Senator in 1869-1881, and then accepted the post of minister to Spain, but in the following year resigned and returned to the United States. He died in Bangor, Me., July 4, 1891.

HAMLINE UNIVERSITY, a coeducational institution in St. Paul, Minn.; founded in 1854 under the auspices of the Methodist Episcopal Church; reported at the close of 1919: Professors and instructors, 32; students 550; president, Samuel F. Kerfoot, D. D.

HAMMER, a tool used for applying the force of impact, either for the purpose of beating malleable materials into a required form, or for driving nails, wedges, etc. The common hand hammer consists of an iron head, usually faced with steel, fixed crosswise on a wooden handle. When one side of the head is thinned out to a wedge form or to a point this is called the "pane" of the hammer. The "face" is the flat disk which strikes the work. Carpenters' and joiners' hammers have a bent pane with a V-shaped notch, which is used as a bent lever for drawing nails, etc. The pane is sometimes sharpened so as to form an adz or chisel. There are also many other modifications in the form of hammers.

A great variety of power-hammers are used. These, for the most part, are masses of iron raised by steam or other power, and then allowed to fall by their own gravity on the work. The "helve" or "shingling" hammer, used for compressing the mass of iron drawn from the puddling-furnace, and the "tilt" hammer, used in the manufacture of shear-steel, are important examples of such hammers. The tilt hammer is similar, but much lighter, and is adapted for striking more than 300 blows per minute. These, when worked by steam, as they are usually, are, of course, steam hammers; and when the term steam hammer is used without qualification it applies to a more elaborate machine of very different construction, invented by James Nasmyth, 1842, and subsequently improved in minor details. In this the hammer is attached to the bottom of a heavy mass of iron, the "hammer-block," capable of rising and falling between upright bars or "guides"; this, again, is fixed to the rod of a piston, which works in a cylinder placed perpendicularly over the hammer-block, hammer and anvil. As the piston rises in the cylinder it lifts the attached mass, which is then allowed to fall from varying heights, according to an adjustment which can be made by an attendant simply touching a handle. The adjustments are so perfect that it may be made to crush a mass of iron, and at the next blow to crack a nut held in the fingers without damaging either kernel or fingers.



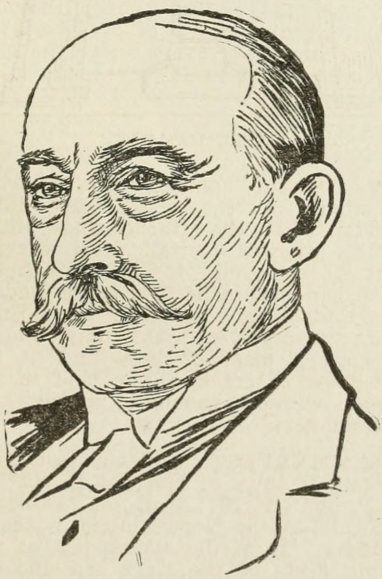
STEEL HAMMER

HAMMERFEST (häm'mer-fest), the extreme N. town of Europe; in lat. 70° 40′ N. and lon. 23° 30′ E., on the island of Kvalö, in the Norwegian province of Finmark. It is the rendezvous of the fishing fleets of the Kara sea and the waters along the Spitzbergen coasts. It imports coal, salt, hemp, flour, etc., in exchange for fish and fish-oil, with some reindeer hides, eider down, and fox-skins. During the two summer months the sun is continually above the horizon. The winter is mild enough to allow of the fisheries being carried on. The town

was burnt July 21, 1890. Pop. about 2,700.

HAMMOND, a city in Lake co., Ind.; on the Grand Calumet river, and on the Pennsylvania Company, the Chesapeake and Ohio, the Pere Marquette, the Michigan Central, and several other important railroads; 18 miles S. E. of Chicago, Ill. It has numerous railway supply shops, foundries, tanneries, chemical works, nail mills, packing houses, etc. There are electric lights, and street railways, public high school, 2 National banks, daily and weekly newspapers, and an assessed valuation of $5,000,000. Pop. (1910) 20,925; (1920) 36,004.

HAMMOND, JOHN HAYS, an American engineer; born at San Francisco in 1855. He received his preliminary engineering training at the Sheffield Scientific School, Yale University, and took his advanced work at the Royal School of Mines, Freiberg, Germany. He received honorary degrees from Stevens Institute of Technology and St. John's College. In 1880, as special expert with the United States Geological Survey, he was engaged in the work of mapping the California gold deposits. As an expert on



JOHN HAYS HAMMOND

mining properties, he was retained as consultant by the Union Iron Works of San Francisco and the Central and Southern Pacific railroads. His wide knowledge of mining operations and mining geology led to his connection with Cecil Rhodes in south African gold development. Active in the Transvaal in 1895-1896, he was arrested, sentenced to death and released upon payment of $125,000 fine. He returned to the United States in 1900 and became interested in the promotion of large-scale mining ventures and various hydro-electric and irrigation works. He became widely known as a University lecturer and was President of the Panama Pacific Exposition Commission, 1912, President of the American Institute of Mining Engineers, 1907-1908, and a member of several scientific societies.

HAMMOND, WILLIAM ALEXANDER, an American surgeon; born in Annapolis, Md., Aug, 28, 1828; was graduated at the University of the City of New York in 1848; joined the United States army in 1849 as assistant surgeon; became surgeon-general in April, 1862; was found guilty of misdemeanor by court-martial and discharged from the army in 1864; practiced in New York till 1878, when the proceedings of the court-martial were reviewed and he was restored to his former rank in the army and retired. His publications include "Military Hygiene"; "Sleep and Its Derangements"; "Nervous Derangements"; "Diseases of the Nervous System"; etc.; also several novels, including "Robert Severne"; "A Son of Perdition"; etc. He died in Washington, D. C., Jan. 5, 1900.

HAMMONTON, a town of New Jersey, in Atlantic co. It is on the Atlantic City and the West Jersey and Seashore railroads. It is the center of an important fruit-growing and poultry-raising region. Its industries include the manufacture of shoes, cut-glass ware, underwear, hosiery, optical instruments, etc. Pop. (1910) 5,088; (1920) 6,417.

HAMMURAPI, a King of Babylon (2124-2081 B. C.). The sixth ruler of the first dynasty of Babylon of the line of Sumuabu the Amorite (2232-2217 B. C.). It is believed that at an early period of his rule he recognized the overlordship of the Elamite King, Kudur Mabuk, his immediate and warlike neighbor. The passage in Gen. xiv: 1 is suggestive of a possible northerly raid by Hammurapi with another King of Elam, Kudur Lagamar by name. It is likely that this event took place subsequent to Hammurapi's operations against the Mesopotamian cities which he is known to have conducted during the early half of his reign. In 2094 he extended his conquests and achieved his independence

over Elam. From this date, his aggressive policy against the outer borders of the Fertile Crescent sent his conquering armies to wrest submission from the Assyrians. Hammurapi possessed a genius for organization, rare among the tribal Kings of the Valley lands. His methods of centralization, communication by writing and delegation of power to properly instructed military sub-lords, together with his vise and economic encourgement of agriculture, building and the arts of peace which brought his kingdom economic prosperity marked him as a great ruler. Perhaps his most valuable contribution from the standpoint of civilization was his codification of the laws of his realms.

HAMMURAPI, CODE OF, the recorded collection of the body of rules governing the procedure of courts, the administration of justice, the positive and negative rules of conduct ordered to be observed in the daily social and commercial life of Babylon in the 22d century B. C. The Code of Hammurapi is contained upon a block of black diorite, a stone of peculiarly high resisting power to weather. This block, about eight feet in height, was discovered on the acropolis at Susa, a former capital, by De Morgan in 1901. Originally found in three pieces, it has been restored, and exhibits beneath a bas-relief of the King receiving the Code from Shamash, the sun-god, 16 columns of engraved text. There were originally 28 of these columns. The authenticity of this block has been established by the later discovery of fragments of copies made from the original text. Among the laws appearing in the Code are recitals of punishment for witchcraft, including trial by ordeal. There were sections devoted to the rights, obligations and duties due to and from owners of private property. There was a considerable section devoted to commercial law, covering loans, pledges and the debtor's position. The law governing injuries to the person or torts provided a graduated scale of damages or reparation which is granted upon the basis of ability of the injured party to stand the loss. The Code is strictly a civil code and there are no religious injunctions. The whole fabric of the Code indicates the state of social flux between an absolute imposition of penalties and a fixed law, and a fixed law with a gradation of greater and lesser offenses with corresponding punishment.

HAMPDEN, JOHN, a celebrated English statesman; born in London, England, in 1594. He was cousin-german by the mother's side to Oliver Cromwell. In 1609 he was entered a gentleman commoner at Magdalen College, Oxford. He began the study of law in the Inner Temple, but inheriting a fortune on his father's death he lived the usual life of a country gentleman. He entered Parliament in the beginning of Charles I.'s reign as member for Grampound, and continued to sit in the House of Commons three times as member for Wendover, and finally for Bucks. Though for years opposing arbitrary practices in Church and State, it was not till 1636 that his resistance to Charles' demand for ship-money made him the argument of all tongues. Though the decision in the Court of Exchequer was given against him by seven voices to five, the victory, as far as regarded public opinion, was his. In the following year (1637) he was one of those who meditated emigration to America, which they were prevented from carrying out by an order in council detaining them. Henceforward he took a prominent part in the great contest between the crown and the Parliament, and was one of the five members whom the king, in 1642, so imprudently attempted, in person, to seize in the House of Commons. When the appeal was made to the sword, Hampden accepted the command of a regiment in the parliamentary army under the Earl of Essex, and was fatally wounded on Chalgrove Field, June 24, 1643.

HAMPDEN-SIDNEY COLLEGE, an institution of learning in Hampden-Sidney, Va.; founded in 1775 by the Presbyterian Church of Hanover and incorporated by the Legislature of Virginia in 1783. It is located on a tract of land given by Peter Johnson in 1773, and which has been increased by purchases and gifts, so that the college now owns about 250 acres. In 1919 it reported: Professors and instructors, 8; students, 159; president, A. W. McWhorter, A. M.

HAMPSHIRE, SOUTHAMPTON, or **HANTS,** a county of England on the southern coast. It includes the Isle of Wight, and has an area of 1,645 square miles. The surface is irregular and is traversed by the North and South Downs. The chief rivers are the Test, the Anton, the Itchen, and the Avon. It is an important agricultural county. Hops are an important crop and extensive truck farming is carried on. The chief centers of trade are Southampton and Portsmouth. The capital is Winchester. Pop. about 1,000,000.

HAMPSTEAD, a parliamentary borough of London, England, situated

on a range of hills 4 miles N. W. of London. It was formerly famous for its medicinal springs, and is still a favorite place of residence and of holiday resort among Londoners. On the summit of the hill (430 feet), above the village, is the Heath, which affords extensive and pleasant prospects of the surrounding country. A house on the Heath was at one time the place of resort of the famous Kit-Cat Club, at which Steele, Addison, Richardson, Walpole, and others used to assemble. Hampstead is associated with many names in literature and art, as those of Pope, Gay, Johnson, Byron, Romney, Coleridge, Keats, Shelley, Leigh Hunt, and Landseer. Pop. 85,500.

HAMPTON, a town and county-seat of Elizabeth City co., Va., on the James river, and on the Chesapeake and Ohio railroad, and several steamship lines; 15 miles N. W. of Norfolk. It is the seat of the Hampton Normal and Agricultural Institute for Indians and Negroes, and a National Soldiers' Home. It is a fashionable resort, having a good bathing ground at Old Point Comfort, and being within 2 miles of Fortress Monroe. It carries on considerable trade in fish and oysters, and manufactures brick and fish oil. The town has weekly newspapers, and a State bank, library, Soldiers' Home and a National Cemetery. Pop. (1910) 5,505; (1920) 6,138.

HAMPTON, a village of Middlesex, England, on the Thames, 15 miles S. W. of London. In the vicinity are many fine mansions and beautiful villas, including Garrick's villa. Pop. about 7,000.

HAMPTON COURT PALACE, long a royal residence, and now partially occupied by persons of good family in reduced circumstances, standing about a mile from the village of Hampton, England, in the midst of grounds that extend to the Thames. The original palace was erected by Cardinal Wolsey, and by him presented (1526) to Henry VIII., who enlarged it and formed around it a royal deer park. Here Edward VI. was born, his mother, Queen Jane Seymour, died, and Charles I. underwent a portion of his confinement. Here, too, was held the famous Hampton Court Conference. The court continued to be a royal residence down to the time of George II. A considerable portion of it was rebuilt by William III., from designs by Wren, and he also laid out the park and gardens in the formal Dutch style. The picture gallery contains several Italian works, Lely's Beauties of the Court of Charles II., and valuable specimens of Holbein, Kneller, West, etc. The gardens have among other attractions a "maze" or labyrinth. Damage, estimated at $100,000, was caused by fire in November, 1886.

HAMPTON, WADE, an American military officer; born in South Carolina in 1754; fought in the Revolutionary War under Sumter and Marion; was a member of Congress, 1795-1797 and 1803-1805. He was commissioned Colonel in the United States army in 1808; promoted Brigadier-General in 1809, and Major-General in 1813; served in the War of 1812; and resigned his commission in April, 1814. He died in Columbia, S. C., Feb. 4, 1835.

HAMPTON WADE, an American military officer; born in Charleston, S. C., March 28, 1818; grandson of WADE HAMPTON (*q. v.*); was graduated at South Carolina College. At the outbreak of the Civil War he was believed to be one of the richest of Southern planters and owned the greatest number of slaves. He entered the Confederate army; raised and in part equipped the Hampton Legion, and was chosen its commandant; was wounded in the first action at Bull Run and also at Gettysburg. He was promoted Major-General May 11, 1864, and in August of the same year appointed commander-in-chief of the Confederate cavalry in northern Virginia; was promoted Lieutenant-General in 1865. He greatly distinguished himself in several important actions, including the defeat of Sheridan's cavalry at Trevillians, Va. After the conclusion of peace he was a stanch advocate of conciliation between the North and South; was elected governor of South Carolina in 1876 and 1878; held a seat in the United States Senate in 1878-1890; and was appointed United States Commissioner of Railroads in 1893. He died in 1902.

HAMPTON NORMAL AND AGRICULTURAL INSTITUTE, a school opened in 1868 in Hampton, Va., under the auspices of the American Missionary Association. In 1870 the school received a charter from the General Assembly of Virginia. The farm land, and the workshops where trades are taught, furnish occupation for the boys, while the girls are similarly instructed and employed in sewing and cooking classes, doing all the domestic duties of the school, and wherever possible learning trades side by side with the boys. At the end of 1919, the institute reported 1,222 students and 111 professors and instructors, President, James E. Gregg, D. D. In 1878, 15 Indians, who had been in charge of Capt. R. H. Pratt, at St. Augustine, Fla., as prisoners of war,

were admitted as students, and from this beginning the Indian Department has increased.

HAMPTON ROADS, a broad, deep arm of Chesapeake Bay at the mouth of James river, between Hampton and Norfolk, Va.; with Newport, Old Point Comfort, Fort Monroe, Fort Wool, and Thimble Shoal Lighthouse at or near the entrance to the bay. Since the Civil War the locality has become popular as a summer and winter resort and as a stopping place for Northern invalids on their way to and from Florida. Its attractions include the beach, bathing places, and promenades of Old Point Comfort, the famous Fort Monroe, the old village of Hampton, National Home for Disabled Soldiers and Sailors, United States National Cemetery, and unsurpassed facilities for short excursions, fishing and yachting. In 1861 the Confederates seized the United States frigate "Merrimac" at Norfolk, covered her hull with railroad iron, and under the name of "The Virginia" sent her to attack the United States vessels lying in Hampton Roads in 1862. She rammed the frigate "Cumberland," which sank in 45 minutes; forced the "Congress" on the Shoal, where she was disabled, set on fire, and blown up, but was prevented by her draught from getting within striking distance of the "Minnesota." On the following morning she reappeared to attack the "Minnesota," but was suddenly confronted by the new Union iron-clad "Monitor," just arrived from New York, which fought her so effectually that she withdrew from the fight, steamed up the river, and refused to come out a second time to meet the "floating Yankee cheese-box."

HAMSTRING. At the back of the knee-joint the tendon of the biceps muscle forms the outer hamstring, and the sartorius (tailor's muscle), with the tendons of the gracilis, semi-tendinosus, and semi-membranosus, the inner hamstring, with the two heads of the gastrocnemius muscle between. The hamstring muscles extend the hip and flex the knee.

HAN, a Chinese dynasty, reigning from 20 B. C. to A. D. 25. It was founded by Lew Pang, and was succeeded by the Eastern Han Dynasty, which lasted till A. D. 237.

HANAU (hä'nou), a town in the Prussian province of Hesse-Nassau; at the confluence of the Kinzig and the Main; 13 miles E. by N. of Frankfort. It is divided into the Old and the New Town; the latter was founded in 1597 by Protestant refugees from Holland and Belgium, who introduced the manufacture of woolen and silk goods, which still flourishes. The town of Hanau stands pre-eminent in Germany for its jewelry and gold and silver wares. Besides these it carries on manufactures of carpets, chocolate, leather, cards, paper, hats, tobacco, and gunpowder, and has breweries and an iron foundry. Here the brothers Grimm were born. In the neighborhood is the watering-place of Wilhelmsbad. Hanau dates as a town from 1393. It had a very chequered history during the Thirty Years' War. Near the town was fought one of Napoleon's last battles in Germany, Oct. 30 and 31, 1813, when he defeated the allied forces under Wrede. Pop. about 37,500.

HANBALITES, a Mohammedan sect; a branch of the Sunnites.

HANCOCK, a village of Michigan, in Houghton co. It is on Lake Portage and on the Copper Range and the Mineral Range railroads. A ship canal gives transportation facilities to Lake Superior, and within its limits are several important copper mines. It has also smelting works, foundries, machine shops, and other industries. It has a park and a Finnish college. Pop. (1910) 8,981; (1920) 7,527.

HANCOCK, JOHN, an American revolutionary patriot and president of Congress; born in Quincy, Mass., Jan. 12, 1737. In the inception of the Revolutionary struggle he was a leading spirit. The attempt to arrest Hancock and Samuel Adams led to the battle of Lexington. Hancock was a member of the Continental Congress from 1775 to 1780, also from 1785 to 1786, serving as president of the body from 1775 to 1777. The Declaration of Independence as first published bore only his name. He served as governor of Massachusetts 12 years. As an orator he was eloquent; as a presiding officer, dignified and impartial. He died in Quincy, Mass., Oct. 8, 1793.

HANCOCK, WINFIELD SCOTT, an American military officer; born in Montgomery Square, Montgomery co., Pa., Feb. 14, 1824; was graduated at the United States Military Academy in 1844, and received his commission of 2d lieutenant; served during the Mexican War, was promoted for gallantry, and, having filled several subordinate posts, made assistant quartermaster-general; in 1861 was appointed a Brigadier-General of volunteers, and attached to the Army of the Potomac, accompanied General McClellan to the peninsula in 1862, and distinguished himself before Yorktown

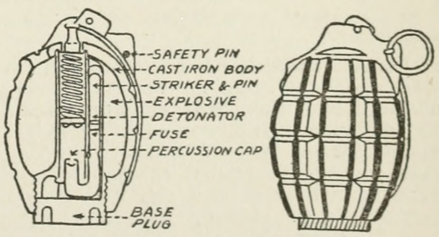
and Williamsburg; at the battle of Fredericksburg, in December, 1862, commanded a division of the 2d Corps, which suffered most severely, and for his services on this occasion received his commission as Major-General; took part in the battles of Chancellorsville and Gettysburg in 1863, and in one of the many struggles of that campaign was severely wounded; in 1868 was appointed by President Johnson to the command of the S. W. military district, but his appointment was not indorsed by the Senate. In June, 1880, he became the unsuccessful Democratic nominee for President. He died in New York City, Feb. 9, 1886.

HAND, the part of the body which terminates the arm, consisting of the palm and fingers, connected with the arm at the wrist; the principal organ of touch and prehension. The human hand is composed of 27 bones, namely eight bones of the carpus or wrist arranged in two rows of four each, the row next the fore-arm containing the scaphoid, the semilunar, the cuneiform, and the pisiform, and that next the metacarpus, the trapezium, the trapezoid, the os magnum, and the unciform. The metacarpus consists of the five bones which form the palm, the first being that of the thumb, the others that of the fingers in succession. Lastly, the fingers proper contain 14 bones called phalanges, of which the thumb has but two, all the other digits having three each.

HANDBALL, a game of ball, played without any instrument for striking, the bare hand only being used. The game is indigenous to Ireland, but has been transplanted to America, where are the most expert players. Two or four men can play, one or two on a side. As far as is known the game of handball came to the United States about 1840.

HANDEL (han'del), properly **HAENDEL** (hen'del), **GEORGE FREDERICK**, a great German composer; born in Halle, Prussia, Feb. 23, 1685. The passion which he early showed for music overcame his father's opposition to training him as a musician, and at the age of 7 he was placed under the tuition of Zachau, organist of Halle Cathedral. In 1696 he was sent to Berlin, where he heard the music of Bononcini and Ariosti. He returned to Halle, was appointed organist of the cathedral in 1702, but soon left to visit Hanover and Hamburg. At Hamburg he played second violin in the orchestra, and brought out in 1704 his first work, an oratorio on the Passion, and his first opera, "Almira," followed in February by his "Nero," and subsequently by his "Florinda and Daphne." In 1706 he went to Italy, visiting Florence, Venice, Naples, and Rome. On his return to Germany he entered the service of the Elector of Hanover, afterward George I. of England, as musical director. He visited England twice, and ultimately having received a pension from Queen Anne, settled down there. He was placed at the head of the newly founded Royal Academy of Music, and accumulated a large fortune. Among the operas which he had composed up to this date (1735) are "Rhadamistus," "Julius Cæsar," "Flavius," "Tamerlane," "Richard I.," "Orlando," "Ariadne," etc. His last opera was performed in 1740. By this time he had begun to devote himself chiefly to music of a serious nature and he produced successfully "Esther" (1731), "Deborah" (1732), "Athalia" (1733), "Israel in Egypt," "L'Allegro and Il Penseroso," "Saul," and "The Messiah," his chief work (1741). In 1742 the "Samson" appeared, in 1746 the "Judas Maccabæus," in 1748 the "Solomon," and in 1752 the "Jephthah." In 1752 he became blind, continuing to perform in public and even to compose. He died in London, April 13, 1759, and was buried in Westminster Abbey.

HAND GRENADES. Offensive and defensive implements of warfare, widely used in the World War. The first devices were extremely crude and consisted of tin cans filled with stones which, on exploding, would cause death or damage. The grenade, however, was quickly developed into a weapon of great destruc-



GRENADES—MILLS HAND GRENADE

tive power by all belligerents. Although differing somewhat in details, the principles of the grenade were practically the same. The one chiefly used by the American force was the so-called Mills grenade, which was thrown by hand. Hand grenades were widely used by raiding parties in quick and sharp attacks.

HANDICAP (for hand i(n) cap, for the drawing of lots out of a hat or cap), an old game at cards, not unlike loo, but

with this difference: the winner of one trick had to put a double stake into the pool, the winner of two tricks a triple stake, and so on. In a race or contest in which the competitors are brought as nearly as possible to an equality by the allowance of time, distance, etc., or the imposition of extra weight.

HANFORD, a city of California, the county-seat of Kings co. It is on the Southern Pacific and the Gulf, Colorado and Santa Fe railroads. It is the center of an important agricultural and oil-producing region, and its industries include fruit-canning factories. It has a public library and two sanitariums. Pop. (1910) 4,829; (1920) 5,888.

HANGCHOW, capital of the Chinese province of Chêkiang, and since the Japanese treaty of Shimonoseki (1895), a treaty port, at the mouth of the Tsientang in the Bay of Hangchau, 110 miles S. W. of Shanghai. The city, one of the great commercial, religious, and literary centers of China, has clean, well-paved streets and many magnificent temples, is a principal seat of the silk manufacture, of gold and silver work, and is noted for the beauty of its surroundings. From a remote period, many spots in the environs have been the resort of pilgrims; and here several thousands of candidates assemble every year for the public examinations. It was formerly a naval port. The river is subject to a dangerous bore or eager. Previous to the Tâiping rebellion, the city had about 2,000,000 inhabitants; but it was then (1861) laid in ruins by the rebels. Pop. about 600,000 of whom about 100,000 are engaged in silk-making.

HANGING GARDENS. The Hanging Gardens of Babylon were anciently reckoned among the wonders of the world. Their construction is variously ascribed to Queen Semiramis and to Nebuchadnezzar. Diodorus and Strabo have given descriptions of them. They are said to have formed a square, with an area of nearly four acres, and rose in terraces, supported on masonry arches, to a height of 75 feet. They were irrigated from a reservoir built at the top, to which water was lifted from the Euphrates by a screw.

HAN-HAI (hän-hī'), an ancient dried-up sea in central Asia, now represented only by Lake Lob-nor.

HAN-KIANG (hän-kyäng'), a river in China, 1,300 miles long. Traffic is considerable and the region watered is in some places styled the "Garden of China."

HANKOW (-kou) ("Mouth of the Han"), a town and river-port in China, in the province of Hupeh, at the junction of the Han with the Yang-tse-kiang; Hanyang being on the opposite bank of the Han, and Wuchang on the other side of the Yangtse. The port was opened to foreign trade in 1862, and has become the chief emporium for the green-tea districts in the central provinces, which formerly sent their produce for export to Canton. Large steamers ascend to the town. In 1857 Hankow fell into the hands of the Tâiping rebels, and was almost completely demolished by them. Pop. about 830,000.

HANLI, a Kashmir altitude, one of the highest inhabited places on the globe; a noted cloister occupies the spot.

HANNA, MARCUS ALONZO, an American legislator; born in New Lisbon (now Lisbon), Columbiana co., O., Sept. 24, 1837. He removed with his father's family to Cleveland in 1852; was educated in the common schools of that city and the Western Reserve College, Hudson, O.; was engaged as an employe in the wholesale grocery house of his father, then in coal and iron. The firm of M. A. Hanna & Co. was important in the lake-carrying business, with interest in lake vessels and their building. He was President of the Union National Bank, Cleveland, and of city railway and mining companies. He was government director of the Union Pacific R. R. in 1882 by appointment of President Cleveland; a delegate to the National Republican Conventions of 1884, 1888 and 1896; elected chairman of the National Republican Committee in 1896; appointed to the United States Senate as a Republican by Governor Bushnell, March 5, 1897, to fill vacancy caused by the resignation of John Sherman, who resigned to accept the position of Secretary of State in President McKinley's cabinet; took his seat March 5, 1897. His term of service under the appointment expired in January, 1898, and he was elected for a second full term. He died Feb. 15, 1904.

HANNAY, JAMES, a British critic and novelist; born in Dumfries, Scotland, Feb. 17, 1827. A few years of boyhood were spent in the navy, from which he was dismissed at 18 by a court-martial sentence, afterward quashed as irregular. He early devoted himself to a life of letters. For several years he edited the Edinburgh "Courant," and was afterward British consul at Barcelona. Of his novels the best are "Singleton Fontenoy" (1850) and "Eustace Conyers" (1855). Other works were "Lectures on Satire and Satirists" (1854); "Essays from the Quarterly Review"

(1861); "Three Hundred Years of a Norman House" (1866); and "Studies on Thackeray" (1869). He died in Barcelona, Spain, Jan. 3, 1873.

HANNIBAL, a city in Marion co., Mo., on the Mississippi river, here spanned by an iron railroad bridge, and on the Burlington, the Missouri, Kansas and Texas, and the St. Louis and Hannibal railroads; 110 miles N. W. of St. Louis. It has steamship communications with all important river ports, and manufactures lime, lumber, machinery, flour, planing mill products, foundry products and supplies, etc. The city has a public library, public high school, the St. Mary's Academy, Riverview Park School, electric lights, and street railways, and daily and weekly newspapers. Pop. (1910) 18,341; (1920) 19,306.

HANNIBAL, the great Carthaginian general; born in 247 B. C. He was the son of Hamilcar Barca and when nine years of age swore, by his father's command, eternal enmity to the Romans, as the condition of accompanying him to Spain. He learned the art of war under his father there, and was present at the battle in which he fell. Hannibal was then 18, and after serving six years under Hasdrubal, who was assassinated 221 B. C., he became commander-in-chief of the Carthaginian army. To complete the conquest of all Spain S. of the Ebro, he besieged the city of Saguntum, which held out for eight months. The city being in alliance with Rome, its fall was the occasion of the great war between Rome and Carthage known as the Second Punic War. Hannibal at once prepared for the invasion of Italy, and in the spring of 218 B. C. he set out on his arduous march from the Ebro, through hostile countries, across great rivers and mountain chains, to the Po. His army, composed of Africans and Spaniards, was greatly reduced in numbers by losses and withdrawals, but he crossed the Pyrenees, forced the passage of the Rhône before Scipio arrived to oppose it, and in October made the passage of the Alps in 15 days. The first engagement took place near the Ticinus, and resulted in the defeat of the Romans. The battle of the Trebia resulted in another Roman defeat. Hannibal was joined by the Gaulish tribes, and took up his winter quarters among them. In the spring of 217 he defeated the consul Flaminius on the shores of Lake Thrasimenus, and destroyed the Roman army. Hannibal advanced S. and passed the Apennines into Apulia, harassed, however, by the new policy of the cautious Fabius, who avoided fighting. In the spring of 216 Hannibal won the great victory of Cannæ, and again destroyed the Roman army. After this victory almost all south Italy declared for him, and he went into winter quarters at Capua. From that time the war changed its character, and it is not possible here to give even a summary of its progress. The conquest and loss of Tarentum, the loss of Capua, the defeat and death of Hasdrubal at the battle of the Metaurus in 207, still left Hannibal strong enough to hold his ground in the S. extremity of Italy for four years longer; but in 203 the scene of war was changed to Africa, and in the following year Scipio finally defeated Hannibal at the battle of Zama, and peace was concluded.

The great Carthaginian did not lose hope, but began preparations for a fresh war. His enemies, however, accused him at Rome, and he fled to the court of Antiochus, King of Syria, who was just entering on a war with the Romans. After three years, the war ending with the defeat of Antiochus, Hannibal, to avoid being given up to Rome, took refuge with Prusias, King of Bithnyia, 190 B. C. And finally, when his surrender was demanded in 183, he put an end to his life by poison.

HANNO, a king or magistrate of Carthage who undertook a celebrated voyage of discovery along the W. coast of Africa between 570 B. C. and 470 B. C. His expedition is said to have consisted of 60 ships; he founded numerous colonies or trading-stations, and proceeded as far S. as a point that has been variously identified with places between Cape Nun and the Bight of Benin. On his return to Carthage he inscribed an account of his voyage on a tablet, and placed it in the temple of Moloch. It seems to have been written in the Punic language; the version of it which remains, entitled the "Periplus of Hanno," is only a Greek translation.

HANOVER, formerly a kingdom in the N. W. of Germany, now a province of Prussia; area 14,870 square miles; pop. about 3,000,000. It is of very irregular shape, and is divided by intervening territories into three distinct portions, besides some small territories to the S., and a range of sandy islands lining the coast. It is divided into six districts—Hanover, Hildesheim, Lüneburg, Stade, Osnabrück, Aurich. The surface in the S. is covered by the Hartz Mountains, but the rest of the country is a low, monotonous flat, with a gentle slope to the North Sea. The Ems, the Weser (with its tributaries, the Leine and Aller), and the Elbe flow through fertile districts industriously cultivated for corn and flax. Near the coast the

land is marshy, but feeds large numbers of very superior cattle.

The Harz Mountains are rich in minerals, the working of which is an important industry. Hanover was long connected with the Brunswick family, and latterly more especially with the line of Brunswick-Lüneburg. Ernest Augustus, a prince of the latter line, became, in 1692, the first Elector of Hanover, married a granddaughter of James I. of England, and was succeeded in 1698 by his son, George Louis, who in 1714 became George I. of England. Henceforth it was ruled in connection with England. In 1814 the Congress of Vienna raised Hanover to the rank of a kingdom, the crown of which was worn by George IV. and William IV., but, on the accession of Queen Victoria, passed by Salic law to Ernest Augustus, Duke of Cumberland. In 1851 he was succeeded by his son, George V., but in 1866, Hanover having become involved in the Austro-Prussian contest, his kingdom was absorbed by Prussia.

HANOVER, capital of the Prussian province of Hanover, situated in an extensive plain on the Leine, which here receives the Ihme and becomes navigable. The old town, irregularly built with many antiquated buildings, is surrounded by the handsome new quarters which have arisen to the N., E., and S. E. The principal buildings are the Market Church, the Old Town House, the Theater, one of the finest in Germany, the Royal Palace, the Museum of Art and Science, the Royal Library, the Waterloo Monument, etc. About a mile to the N. W. is Schloss Herrenhausen, the favorite residence of George I., George II., and George V. Near the town is the colossal Welfenschloss, or palace of the Guelphs. Hanover prior to the World War was a manufacturing town of some importance, had cotton-spinning, machine works, iron foundries, chemical works, tobacco and cigar factories, etc. Hanover is first mentioned in 1163. It joined the Hanseatic League in 1481. It became the residence of the dukes of Brunswick-Lüneburg, and capital of the principality in 1636. Pop. about 313,000.

HANOVER, a borough of Pennsylvania, in York co. It is on the Pennsylvania and the Western Maryland railroads. It is in the center of an important agricultural and iron-ore region. Its industries include the manufacture of cigars, gloves, silks, water wheels, flour, shoes, furniture, wire cloth, etc. The borough has a public library, and a handsome high school, and two parks. Pop. (1910) 7,057; (1920) 8,664.

HANOVER COLLEGE, a coeducational institution in Hanover, Ind., founded in 1828 under the auspices of the Presbyterian Church, reported at the close of 1919: Professors and instructors, 14; students, 224; president, W. A. Millis, LL. D.

HANSEATIC LEAGUE, a celebrated confederacy formed in the 13th century between certain commercial towns, with the view at once of restraining the rapacity of kings and nobles, and clearing the Elbe, the German Ocean, and other places from the pirates and robbers by which they were then infested. Becoming powerful, the League concluded treaties with monarchs, raised troops, and made war, as if it had been an independent political power. At the time when the League flourished most, it consisted of 85 confederate towns. It gave a powerful impulse to commerce, and when in 1631 it in large measure fell to pieces, it left behind various free republics which continued for a long period of time.

HAPGOOD, ISABELLA FLORENCE, an American translator and writer; born in Boston, Mass., Nov. 21, 1851. She published "The Epic Songs of Russia," "Russian Rambles," "A Survey of Russian Literature" (1902); "Service Book of the Orthodox Catholic Church" (1906), etc. Is well known as a translator of the works of Gogol, Hugo, and other great European writers.

HAPGOOD, NORMAN, an American journalist; born in Chicago, Ill., March 28, 1868. He was graduated at Harvard, the Harvard Law School, and studied literature in Europe. He became dramatic critic for the New York "Commercial Advertiser" and "Bookman," and published "Literary Statesmen" (1897); "Abraham Lincoln" (1899); "Daniel Webster" (1899); "The Stage in America" (1901); "Industry and Progress" (1911). In 1903 he became editor of "Collier's Weekly" and subsequently of "Harper's Weekly." He served as Minister to Denmark in 1919.

HAPSBURG, or **HABSBURG** (häps' börg), (properly HABICHTSBURG or HABSBURG, the hawk's castle), a small place in the Swiss Canton of Aargau, on the right bank of the Aar. The castle was built about 1027 by Bishop Werner of Strassburg. Werner II., who died in 1096, is said to have been the first to assume the title of Count of Hapsburg. After the death, about 1232, of Rudolph II., the family divided into two branches, the founder of one of which was Albert IV. In 1273 Rudolph, son of Albert IV.,

was chosen Emperor of Germany, and from him descended the series of Austrian monarchs, all of the Hapsburg male line, down to Charles IV. inclusive. After that the dynasty, by the marriage of Maria Theresa to Francis Stephen of Lorraine, became the Hapsburg-Lorraine. Francis II., the third of this line, was the last of the so-called "Holy Roman Emperors," this old title being changed by him for that of Emperor of Austria. From the Emperor Rudolph was also descended a Spanish dynasty which began with the Emperor Charles V. (Charles I. of Spain), and terminated with Charles II. in 1700. The castle of Hapsburg is still to be seen on the Wülpelsberg. In 1881 the Austrians proposed to purchase the castle of Hapsburg and give it as a wedding gift to the Crown-prince of Austria; but the people of Aargau refused to hear of the sale.

HARAR (hä-rär′), a city of Africa, in the country of the Gallas, about 200 miles W. S. W. of Berberah; on the slopes of the mountains which surround it, Mount Hakim on the W. rising to 8,400 feet. It is fenced with a low wall and forts, the wall being pierced by five gates. The streets are simply water-channels crossing the uneven surface; the houses are partly stone edifices, partly huts. In the neighborhood are fine banana groves and coffee gardens. Coffee, hides, cattle, and a dyestuff called wars, are the principal objects of commerce. Harar, which was converted to Islam in 1521, was formerly the capital of an independent state. In 1875 it was conquered by the Egyptians, who, however, handed it back to its native emir the same year. Pop. composed of native Harari (nearly one-half), Gallas, Somali and Abyssinians.

HARBIN, or **KHARBIN**, a city of Manchuria, China, in the province of Kirin, situated on the Sungari river, 615 N. E. of Port Arthur and 350 miles N. W. of Vladivostok. The city is not the result of natural development, but was the built-up headquarters of the military and railroad administration of the Russian Imperial Government in Manchuria. The first buildings were erected in 1896, the larger part being the residences of the Russian officials while the native quarter was largely made up of the railroad workers and other manual laborers. During the Russo-Japanese War, in 1904, the city was an important base for the Russian forces. In 1907, in accordance with the terms of the Chino-Japanese Treaty of 1905, the city was officially thrown open to the trade of the world. Consulates were established here by Germany, Great Britain, France, and the United States. As the central point of railway administration, it was natural that many extensive railway repair machine shops should be established here, but there were also 18 flour mills, meat packing establishments, brick yards, sugar refineries, candle factories. During the World War Harbin was active as a central depot of supplies along the route by which Russia received munitions of war from her allies. After the fall of the Czar's Government and the temporary Revolutionary régime under Kerensky, the Bolsheviki attempted to establish a soviet government here, in 1918, but the intervention of the United States and other Allied forces drove the influence of the Bolsheviki out of Manchuria. Nominally the Russian Government, as represented by various anti-Bolshevik Cossack leaders, still is in possession, but actually it is occupied by the Japanese. The total population before the World War was about 60,000.

HARBOR GRACE, a port of entry and the second town of Newfoundland, on the W. side of Conception Bay, 84 miles W. N. W. of St. John's. It has a large but somewhat exposed harbor, with a revolving light, and carries on a considerable trade. It is the seat of a Roman Catholic bishop, and contains a Catholic cathedral and convent. Pop. about 4,300.

HARBORD, JAMES GUTHRIE, an American soldier, born in Bloomington, Ill., in 1866. He graduated from the Kansas State Agricultural College in 1886. He entered the army as a private in 1889, and became 2d lieutenant in 1891. During the Spanish-American War he served as major of the 2d Volunteer Cavalry, and at the close of that war he was appointed 1st lieutenant of the 10th United States Cavalry. He rose through successive grades, becoming major in 1914, and lieutenant colonel of the General Staff in 1917. In the same year he was appointed brigadier-general in the National Army, and in the following year was appointed major-general of the National Army. He was chief of staff of the American Expeditionary Force in France, from May, 1917, to May, 1918. In the latter year he commanded the Marine Brigade near Château-Thierry. He was commander of the 2d Division, and following this had charge of the Service Supply until May, 1919. In May of that year he was reappointed chief of staff of the American Expeditionary Force. From August to November, 1919, he was Chief of the

American Military Mission to Armenia, and made a detailed report of conditions in that country. He was awarded the Distinguished Service Cross.

HARBURG (här'börg), a seaport of Prussia, in the province of Hanover, 5 miles S. of Hamburg, on the Elbe. Its industries prior to the World War included gutta-percha goods, palm-oil, cotton-seed oil, saltpeter and other chemicals, artificial manure, walking sticks, leather, mineral water, machines, beer, and jute. After the deepening of the Elbe the commerce of Harburg greatly increased. It is a place of holiday resort for the Hamburgers. Pop. about 67,000.

HARCOURT, SIR WILLIAM GEORGE GRANVILLE VENABLES VERNON, a British lawyer and politician, son of the Rev. William Vernon Harcourt; born Oct. 14, 1827. He was educated at Trinity College, Cambridge, was called to the bar in 1854, became Queen's Counsel in 1866; contributed frequently to the press; was returned for Oxford city in 1869 in the Liberal interest; distinguished himself by his powers of satire and ridicule in debate; was made solicitor-general in Mr. Gladstone's ministry, November, 1873; home secretary in 1880, when he lost his seat for Oxford, but was returned for Derby. He introduced the Arms Bill (Ireland), 1881; Prevention of Crimes Bill, 1882; an Explosives Bill, 1883. In February, 1886, he was made chancellor of the exchequer; and after the resignation of Mr. Gladstone's ministry became a prominent leader of the Gladstonian section; in 1892 was reappointed chancellor of the exchequer. Died Oct. 1, 1904.

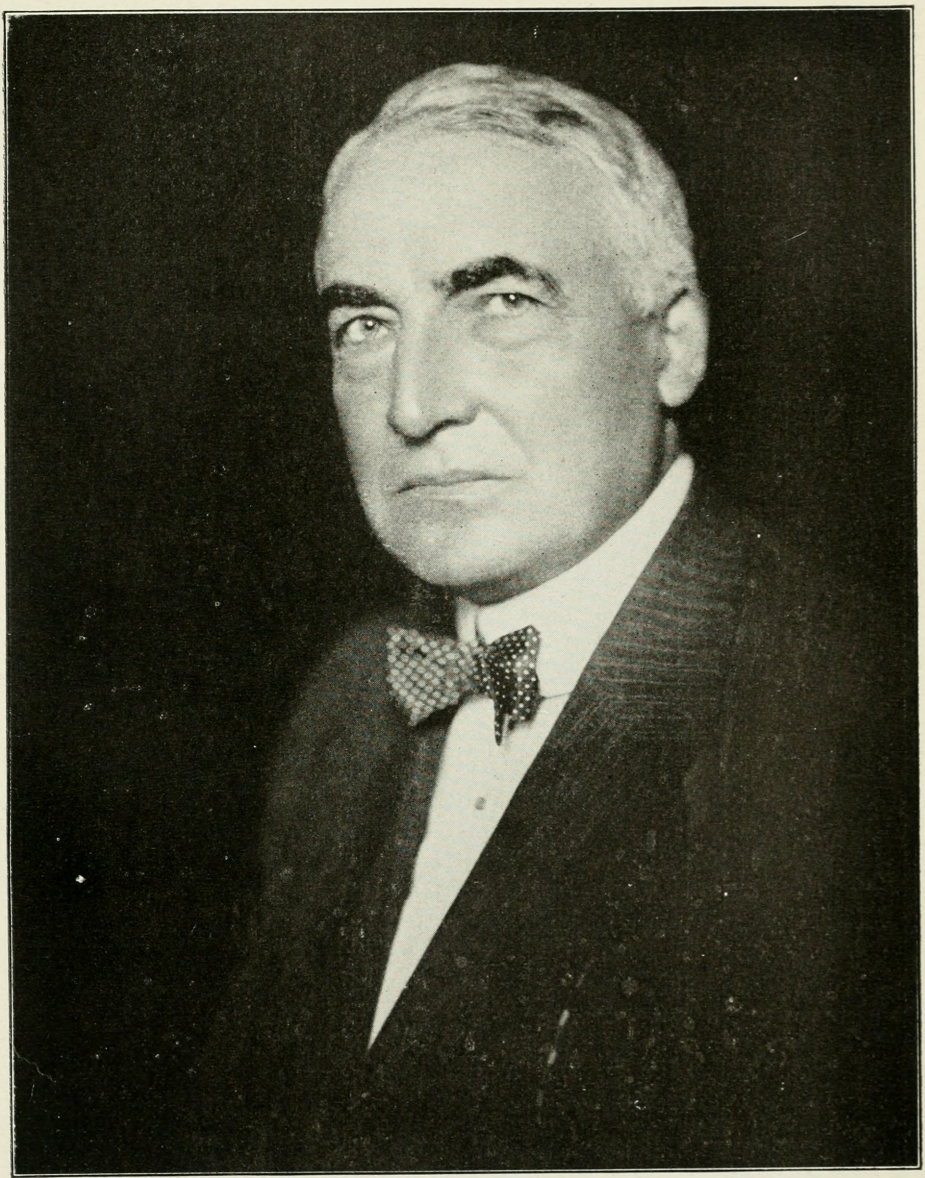
HARDEE, WILLIAM J., an American military officer; born in Savannah, Ga., Oct. 10, 1815; was graduated at the United States Military Academy in 1838; served with distinction in the Mexican War; in the Civil War entered the Confederate army with the rank of colonel; commanded a corps at Shiloh; promoted to lieutenant-general in 1862; commanded the left wing of the Confederate army at Perryville; defended Savannah against General Sherman in December, 1864. He died in Wytheville, Va., Nov. 6, 1873.

HARDEN, MAXIMILIAN FELIX ERNST, a German editor and journalist, born in Berlin, 1861, son of a Jewish merchant named Witowski. He was educated in the French Gymnasium in Berlin, then began his life vocation as a journalist, first attracting attention by his political articles, written under the pseudonym "Apostata." In 1892 he founded and began to edit his famous weekly paper, "Die Zukunft" (the Future). His pungent and critical editorials soon gained for him national prominence. With bitter invective and satire he pointed out the evils of the government and German society which made his paper the most feared of all German publications by the ruling classes. He showed himself bitterly opposed to the war when Germany attacked France in 1914. Many editions of his paper were confiscated or suppressed by the Government during the war. Harden was especially strong in his denunciation of the Government's anti-American policy, and referred to the United States as "a great storehouse of idealism." Much capital was made of Harden's many exposures by the Socialists, but Harden himself was never a Socialist, and wrote as bitterly against Bolshevism as he had against German Imperialism.

HARDERWIJK (här'der-wīk), a fishing town of the Netherlands, on the S. E. shore of the Zuider Zee, 31 miles N. E. of Utrecht. From 1648 to 1811 it was the seat of a university. It is now a depot for recruits for the Dutch East Indian army.

HARDICANUTE (-nūt'), a king of England, son of Canute the Great and Emma of Normandy, the widow of Ethelred II.; born about 1019. At the time of his father's death (1035) Hardicanute was in Denmark, and the throne was given to Harold, his younger brother; Wessex, however, was reserved for the absent prince, whose claims to the kingdom were upheld by Godwin and Emma. On the death of Harold, in 1040, Hardicanute was elected king in his place. In the short space of two years he provoked the discontent of his subjects by the imposition of a very heavy danegeld. He died in Lambeth, near London, June 8, 1042.

HARDING, WARREN GAMALIEL, an American statesman, elected President of the United States, on Nov. 2, 1920. He was born in the village of Blooming Grove, O., on Nov. 2, 1865, on a farm belonging to his grandfather, Charles Harding, who was one of the pioneers in the settlement of Ohio. The boy was the oldest of eight children. His father, George Tyron Harding, was a village physician and cultivated a small farm to aid in the support of the large family. His mother was Phebe Dickerson, who was descended from an old-time Holland-Dutch family, the Van Kirks. His first education was obtained in the country school of the neighborhood, and at the age of 14 he entered



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PRESIDENT WARREN GAMALIEL HARDING

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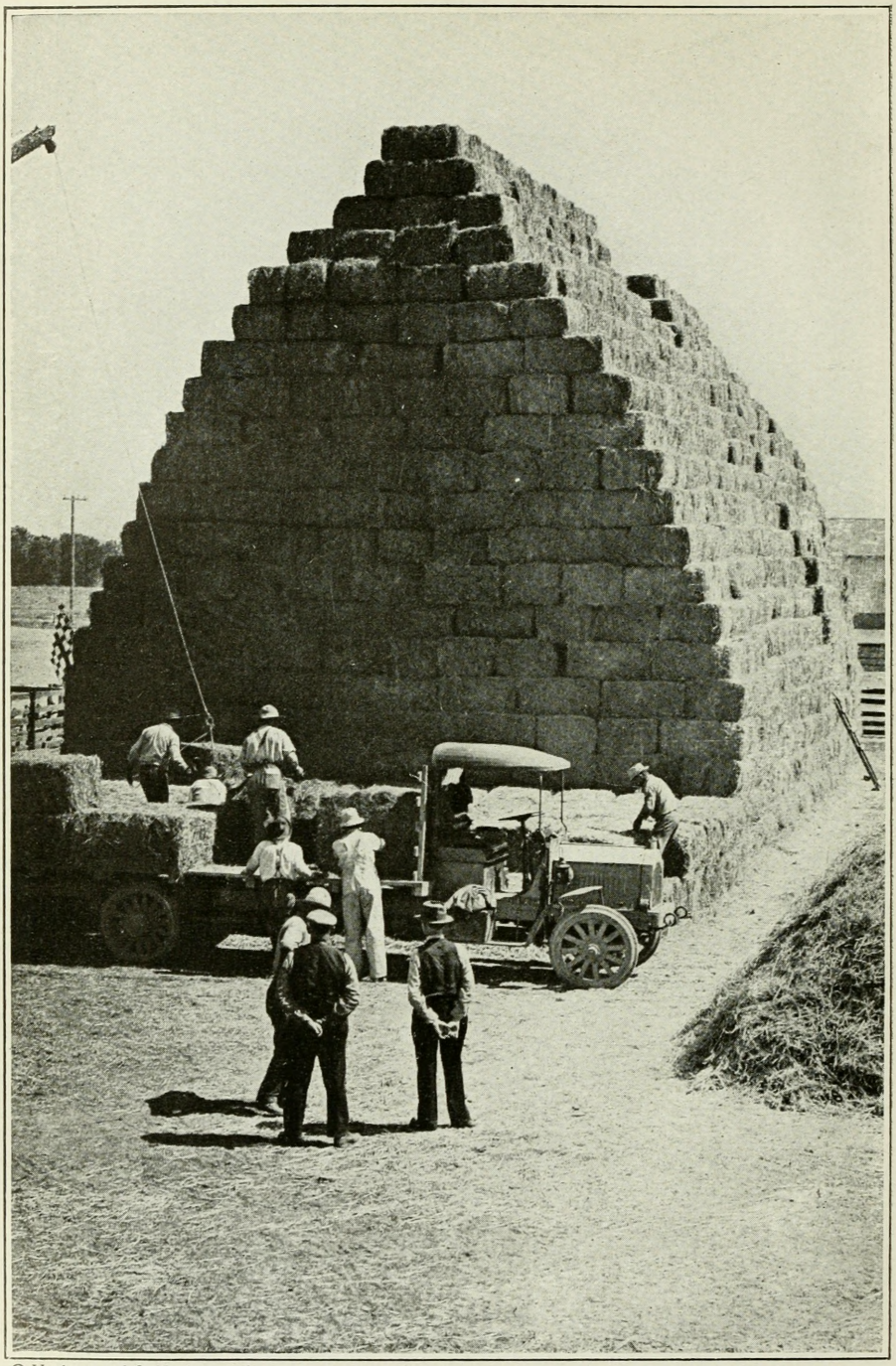
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THE ROYAL PALACE AT THE HAGUE, CAPITAL OF THE NETHERLANDS



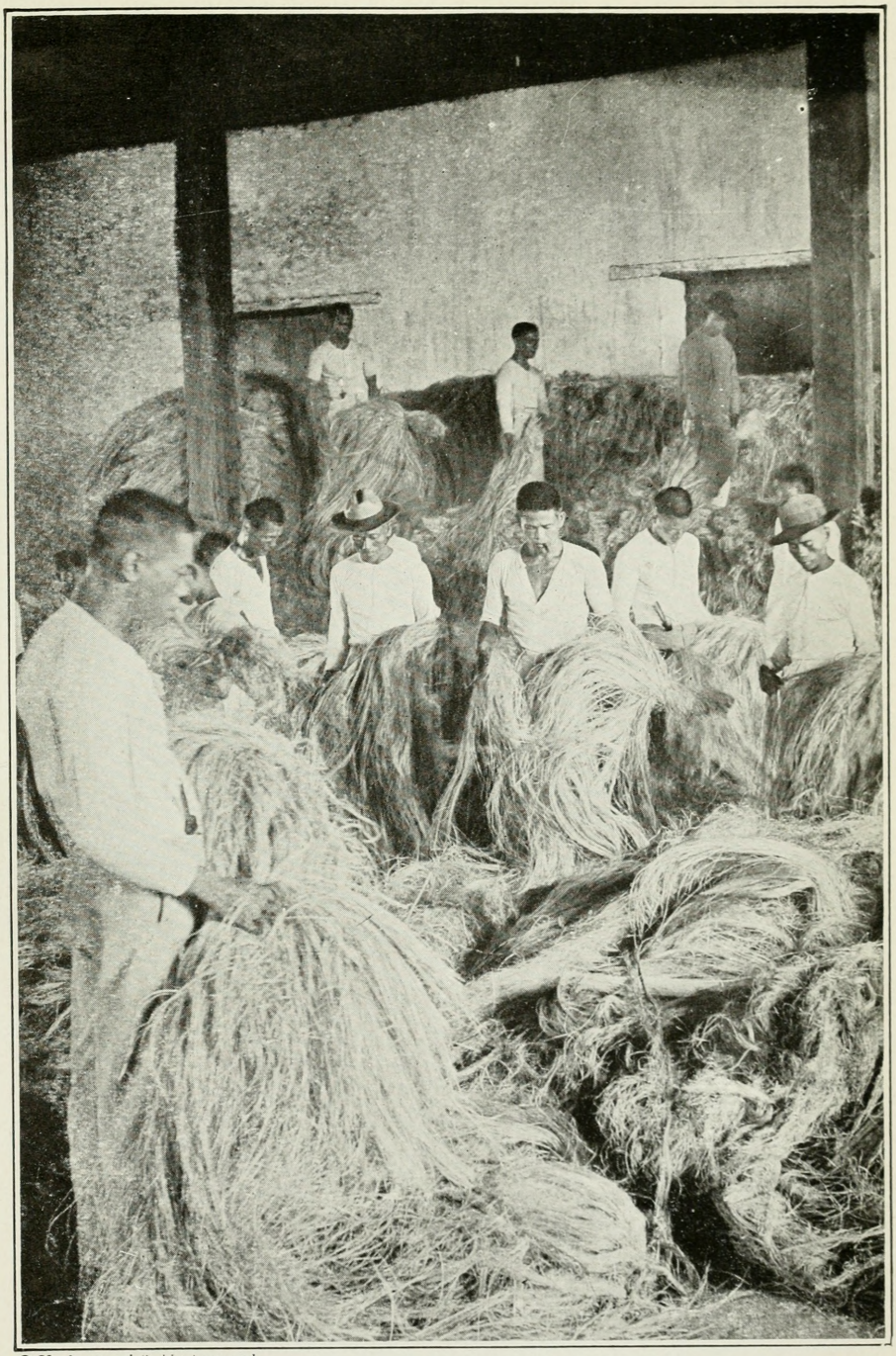
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A STREET IN PORT AU PRINCE, HAITI, SHOWING NATIVE STORES



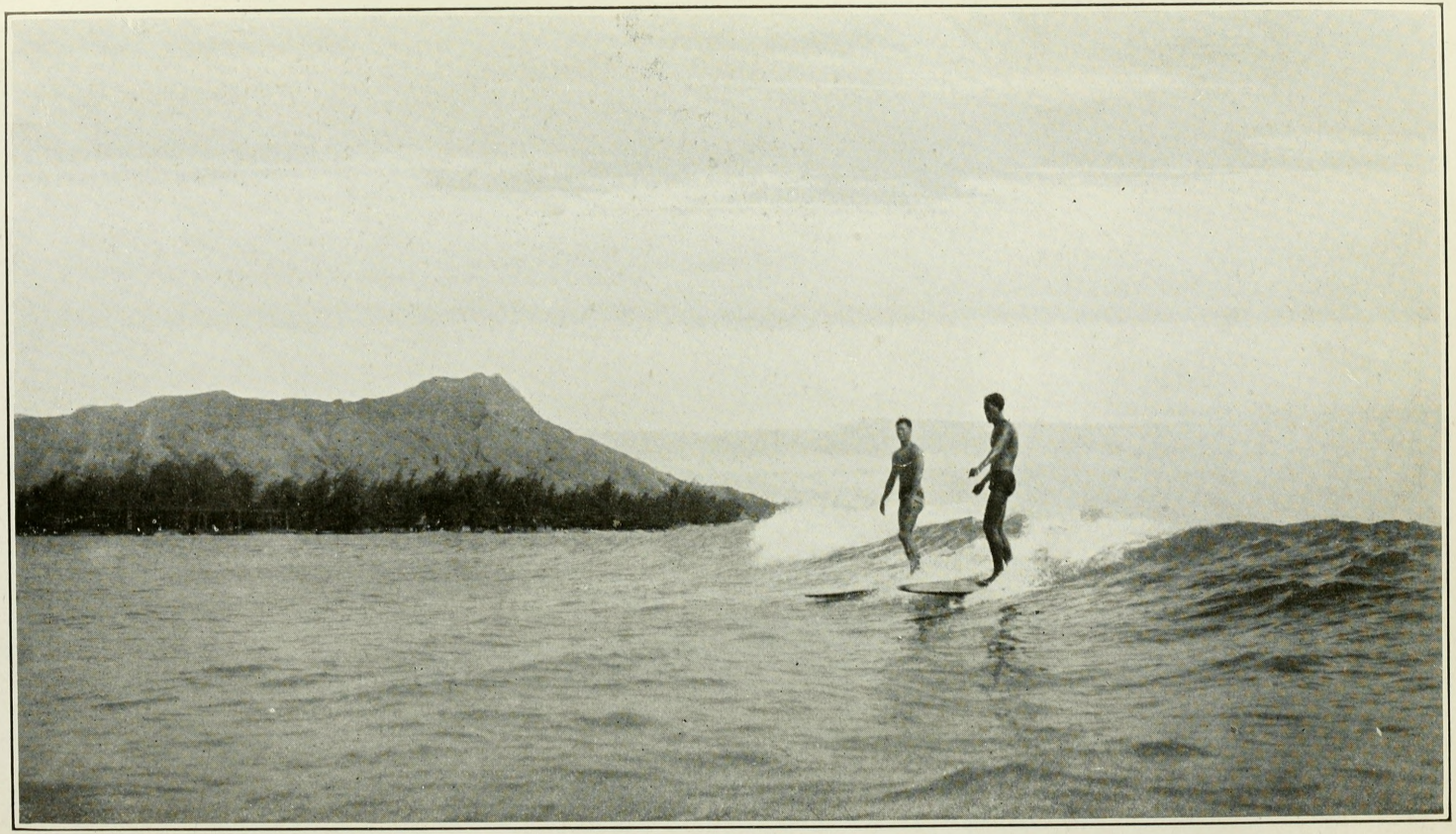
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STACKING BALED HAY ON A RANCH NEAR MERCED, CAL.



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PREPARING HEMP FOR ROPE MAKING, MANILA, PHILIPPINE ISLANDS



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SURF RIDING AT WAIKIKI BEACH, HONOLULU. AT THE LEFT IS DIAMOND HEAD



©Ewing Galloway

HEIDELBERG, GERMANY, ON THE NECKAR RIVER



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THE HARBOR AND CITY OF HAVANA, CUBA, AS VIEWED FROM CABANAS FORTRESS

the Ohio Central College at New Iberia, and completed the course, which was hardly more than a high school course of the present day. He showed considerable aptitude in study and graduated with distinction. As an editor of the college paper, he showed a marked bent for the profession in which he afterward engaged, that of journalism. At about the time of his graduation from college, his father removed to Marion, Hardin co., O., a town of 4,000 people. Young Harding at once secured employment in a newspaper office of the city, and there learned all the practical details of the printer's trade. Although he was not at this time active in politics, he ardently supported James G. Blaine. As the newspaper on which he was working was Democratic in its political preferences, Harding was discharged. He soon found the opportunity for realizing his ambition of owning himself a newspaper, and when the "Star," published in Marion, was about to be sold by the sheriff, Harding and a friend borrowed the few hundred dollars necessary and began its publication in November, 1884. After several years of financial difficulties, the paper became a success, due in no small measure to the editorial policy of the paper and the editorials contributed by its editor. Harding soon became known as a forceful writer and a man of rapidly developing personality. His first entrance into active politics was his election to the State Senate in 1900. He was re-elected and at the expiration of his second term was chosen lieutenant-governor of Ohio. He declined the renomination for this office. In 1910 he was the Republican candidate for governor, but was defeated. Following this he publicly announced his withdrawal from politics. Two years later found him in the thickest of the political fight in the support of the Republican candidate for the presidency. He declared himself a candidate for the Senate in 1914 and was nominated, defeating Senator Foraker. He was elected to the Senate by over 100,000 majority. He was the first Senator elected from Ohio under the system of direct elections. In the Senate, although not a frequent speaker, he was admitted to be one of the strongest members, and, when he did address the Chamber, he was listened to with closest attention. He supported, on the whole, all the important measures adopted by the progressive element of the party, including the woman's suffrage amendment, the legislation in behalf of labor, child labor law, and measures of like character. He was a member of the Committee on Foreign Relations, and as such took an important part in the deliberations on the peace treaty, to the ratification of which, in the form in which it appeared before the Senate, he was opposed.

The struggle between the radical and the progressive elements of the Republican party for the nomination for the presidency in June, 1920, naturally brought into consideration Senator Harding, who had not been aggressively identified with either section. He was, moreover, from Ohio, which was considered to be one of the doubtful States. His strength in the Convention grew from the beginning, although he had no organization and had not declared himself to be a candidate before the Convention met. His principal opponents were General Leonard Wood, Governor Lowden of Illinois, and Hiram Johnson of California. The delegates, unable to compromise on any of these, selected Senator Harding. He was elected on November 2 by the largest majority ever given a presidential candidate. For an account of the presidential election, see UNITED STATES HISTORY. Following his election, Senator Harding made a brief trip to the Panama Canal and the Canal Zone, where he was received with great enthusiasm. On his return he devoted himself to the selection of his cabinet officers and to conferences with prominent representatives of the policy to be followed during his administration.

HARDINGE (-ding), **HENRY HARDINGE, VISCOUNT**, a British soldier and governor-general of India; born in Wrotham, Kent, England, March 30, 1785. Gazetted an ensign in 1798, he served through the Peninsular war, being wounded at Vimiera and Vittoria, and taking a decisive part in the sanguinary contest at Albuera. From 1809 to 1813 he was also attached to the Portuguese army as a deputy quartermaster-general. On the renewal of hostilities after Napoleon's escape from Elba, he hastened to join Wellington, who appointed him commissioner at the Prussian headquarters. In consequence of a severe wound received at Ligny he was unable to take part in the battle of Waterloo. From 1820 to 1844 he was active in Parliament, holding the office of Secretary of War under Wellington in 1828, and afterward the chief secretaryship of Ireland under the same duke and under Peel. In 1844 he was appointed governor-general of India. He was present at the battles of Mudki, Firozshah, and Sobraon in the first Sikh war, as second in command to Lord Gough. After the peace of Lahore (1845) he was created a viscount, and

granted a pension of $25,000 by the East India Company as well as one of $15,000 for three lives by Parliament. Four years after his return to England he succeeded (1852) Wellington as commander-in-chief of the British army. In 1855 he was made field-marshal. In July of the following year he resigned the office of commander-in-chief, and died in South Park, near Tunbridge, England, Sept. 24, 1856.

HARDY, ARTHUR SHERBURNE, an American novelist; born in Andover, Mass., Aug. 13, 1847. He was graduated from the United States Military Academy and commanded a military post in the South for two years. His poetry consists mainly of lyrics and sonnets, while his novels are full of interest and charm. He was a skilled musician. In 1897 he was appointed minister to Persia. "But Yet a Woman" and "The Wind of Destiny" and "Passe Rose" represent his earlier style. His later novels include: "His Daughter First" (1903); "Aurelie" (1912); "Diane and Her Friends" (1914); "No. 13 Rue du Bon Diable" (1917). His poems were published in numerous magazines, and some of his mathematical studies took shape in a volume on "Quaternions." "Songs of Two" appeared in 1900.

HARDY, THOMAS, an English novelist; born in Dorset, England, June 2, 1840. He was brought up as an architect, and practiced some time at Dorchester, next prosecuted his studies in design at London, gaining professional distinction. His intention was now to become an art critic, but the experiment of a not wholly unsuccessful work of fiction, "Desperate Remedies" (1871), shaped his destiny otherwise. His next novels, "Under the Greenwood Tree" (1872) and "A Pair of Blue Eyes" (1873), prepared the way for his first great work, "Far from the Madding Crowd," published in the "Cornhill Magazine" in 1874. Its immediate success secured its author an audience for a series of novels: "The Hand of Ethelberta" (1876); "The Return of the Native" (1878); "The Trumpet-major" (1880); "A Laodicean" (1881); "Two on a Tower" (1882); "The Mayor of Casterbridge" (1886); "The Woodlanders" (1887); "Tess of the D'Urbervilles" (1891); and "Jude the Obscure" (1895); "Wessex Tales" (1888); "A Group of Noble Dames" (1891); "Life's Little Ironies" (1894); "The Three Wayfarers" (1893); "Wessex Poems" (1898); "Times' Laughing Stock" (1910); "Satires of Circumstance" (1915); "The Dynasts," etc.

HARE, in zoölogy, various species of *Lepus*, specially *L. timidus*. It does not make a burrow like the rabbit, but lurks in a seat or form, which it varies according to the season, and in severe weather betakes itself to the woods. It is, properly speaking, a nocturnal animal and is very prolific. Modern science places it among the rodents, with which its anatomical construction entirely agrees. In astronomy Lepus, one of the 15 ancient S. constellations.

HARE, AUGUSTUS JOHN CUTHBERT, an English descriptive writer; born in Rome, Italy, March 13, 1834. He was a graduate of Oxford. The son of a rich father, he was enabled from his earliest youth to gratify a taste for travel, on descriptions of which his fame chiefly rests. Among his happiest efforts are: "A Winter at Mentone" (1861); "Walks in Rome" (1870); "Wanderings in Spain" (1872); "Walks in London" (1877); "Days Near Paris" (1887); and a narrative of travel in southern France. A volume of personal recollections (1895) has been widely read. Died 1903.

HARE, SIR JOHN, an English actor; born in London, England, May 16, 1844. Traveled largely in the United States at the head of his own company, and was celebrated in comedy, emotional and quaint character rôles. He appeared in "The Profligate"; "The Gay Lord Quex," "Notorious Mrs. Ebbsmith"; "Pair of Spectacles"; and other important plays. He was knighted in 1907.

HAREM (hä-rēm′) (Arabic, the prohibited), a word used by Mussulmans to signify the women's apartments in a household establishment, forbidden to every man except the husband and near relations. The women of the harem may consist simply of a wife and her attendants, or there may be several wives and an indefinite number of concubines or female slaves, with black eunuchs, etc. The greatest harem is that of the Sultan of Turkey. The women of the imperial harem are generally Circassians or Georgians. The women of other Turks enjoy the society of their friends at the baths or in each other's houses, and appear in public accompanied by slaves and eunuchs; but the women of the sultan's harem have none of these privileges. Only a comparatively few wealthy Turks now maintain harems. They have generally but one wife.

HARFLEUR (är-fler′) (called in the Middle Ages Hareflot), a town of France, department of Seine-Inférieure; on the estuary of the Seine; 4 miles E. of Havre. Formerly Harfleur was an

important seaport and maritime fortress, but the rise of Havre, coupled with the sanding up of its harbor, led to its decay. It was taken after a six weeks' siege by the English under Henry V. in 1415, and during the next 25 years changed hands three times. It was pillaged by the Huguenots in 1562.

HARI-RUD (hä-rē-rod'), or **HERI-RUD** (her-ē-), a river of Asia, which rises in the Hindu Kush about 150 miles W. from Kabul, pursues a W. course through Afghanistan for nearly 250 miles; then, bending suddenly to the N., it forms the boundary between Persia and Turkestan, and, after a further course of about 250 miles, loses itself in several arms in the Tekke Turkoman oasis.

HARLAN, JOHN MARSHALL, an American jurist; born in Boyle co., Ky., June 1, 1833, was graduated at Centre College in 1850; became a lawyer; served in the Civil War; was attorney-general of Kentucky; a member of the Louisiana Investigation Commission of 1877, and in the same year was made associate justice of the Supreme Court of the United States. In 1892 he was an arbitrator on behalf of the United States before the Bering Sea tribunal. He died in 1911.

HARLAND, HENRY, pseudonym SIDNEY LUSKA, an Anglo-American novelist; born in St. Petersburg, Russia, in March, 1861. He removed to London, where he edited the "Yellow Book." He wrote: "As It Was Written" (1885), "Mrs. Peixada" (1886); "The Land of Love" (1887); "My Uncle Florimond" (1888); "The Yoke of the Thorah" (1887); "Mr. Sonnenschein's Inheritance" (1888); "A Latin-Quarter Courtship"; "Comedies and Errors" (1898); "Cardinal's Snuff-box" (1900); etc. He died in 1905.

HARLAND, MARION. See TERHUNE.

HARLAW, a place 18 miles N. W. of Aberdeen, the site of a battle fought July 24, 1411, between the Highlanders, led by Donald, Lord of the Isles, and the Lowlanders of Mar, Garioch, Buchan, Angus, and Mearns, under Alexander Stewart, Earl of Mar. The battle was long and bloody, but the Highlanders were at last defeated.

HARLEM, a part of New York City above 106th street. See NEW YORK CITY.

HARLEM RIVER, a tidal channel which separates Manhattan Island from the mainland of the State of New York. It communicates with the Hudson river on the W. by means of Spuyten Duyvil creek, and with the East river at Hell Gate. It is about 7 miles long. The Harlem canal, which connects with the East river, was opened June 17, 1895.

HARLINGEN (här'ling-en), a seaport of the Netherlands, in the province of Friesland, on the Zuider Zee, 14 miles W. by S. from Leeuwarden. It has a good harbor, protected from the sea by dykes. The manufacture of woolen sacks and machines and shipbuilding are the chief industries. Butter and cattle are exported to England. Pop. about 11,000.

HARMON, JUDSON, an American public official, born in Newton, O., in 1846. He graduated from Denison University in 1866, and from the Cincinnati Law School in 1869. He was elected Mayor of Wyoming, O., in 1875, and from 1876 to 1877 he was judge of the Court of Common Pleas, and was judge of the Superior Court from 1878 to 1887. He was appointed attorney-general of the United States by President Cleveland, in 1895, serving until 1897. He was governor of Ohio from 1909 to 1911, and from 1911 to 1913. In 1912 he was a Democratic candidate for the nomination for the presidency.

HARMONIC, in mathematics, applied to numbers, terms of certain ratios, proportions, etc., which have certain relations or properties resembling those of musical concords. In music, applied to the sounds produced by a vibrating string or column of air, when it is subdivided into its aliquot parts. Also (1) One of the sounds produced by a vibrating string or column of air, when it is subdivided into its aliquot parts. (2) An artifical tone produced in a stringed instrument (*a*) by varying the point of contact with the bow, or (*b*) by slightly pressing the string at the nodes or divisions of its aliquot parts (½, 1-3, ¼, etc.). In wind instruments, harmonics are produced by varying the intensity of the air current from the mouth. See HARMONY.

HARMONY, a union of sounds which individually appear different, but when heard together form a collective sound called a chord. All musical compositions can be reduced to a fundamental harmony of successive chords, which, in their progression, are regulated by the rules of the theory of music. Dissonant as well as consonant chords are included as forming harmony, as they are a union of several sounds that have but one fundamental sound or bass note in common. The harmony of chords can either be close or open, which the position or distance of the sounds or intervals from

one to another, forming the chords, determines. Close harmony is when the sounds composing each chord are placed so near to each other that no sound belonging to the chord could again be interposed between any of those already present. Open harmony is when the sounds of a chord are placed at a greater distance from each other, so that some of them might be again interposed between the parts of those sounds already present. The common chord of a third, fifth and octave to a bass note is the most pure and perfect harmony; after which follow the chord of the seventh and the chord of the ninth.

HARNACK, ADOLF, a German theologian, born in Dorpat, Russia, in 1851. He was educated at Dorpat University and at Leipzig. He served as professor of Church history in several German universities, including Berlin and Marburg. His lectures in Berlin were attended by hundreds of students of both Europe and America. He edited many important theological works and wrote much on theological subjects. The work best known to the English-reading public is "What Is Christianity?" translated in 1901. Other works translated include "The Expansion of Christianity" (1905); "New Testament Studies" (1907); and "Bible Reading in the Early Church" (1912).

HARNED, VIRGINIA, an American actress, born in Boston in 1868. She made her first appearance on the stage at the age of 16, and after several engagements, became leading woman for E. H. Sothern, whom she married in 1896. The marriage was dissolved in 1910. She played leading parts in several well-known plays and created the title rôle of "Trilby."

HARO, or SAN JUAN (sän hwän') **ARCHIPELAGO**, a cluster of islets owned by the United States, lying off the S. end of Vancouver Island.

HARO, THE CRY OF, an old form of appeal in Normandy and the Channel Islands, equivalent to a demand either for protection against bodily harm of for assistance to arrest an adversary. The word was anciently understood to be an appeal to Rolf, Rollo, or Rou, the first Duke of Normandy; a better derivation seems to be from the Old High German *hera* or *hara*, here, making haro simply a cry for aid.

HAROLD I., surnamed HAREFOOT, Danish king of England, succeeded his father Canute in 1035 as king of the provinces N. of the Thames, and became king of all England in 1037. His countrymen, the Danes, maintained him upon the throne against the efforts of Earl Godwin in favor of Hardicanute; and Harold latterly gained the earl over. After a reign of four years Harold died in 1040.

HAROLD II., King of England; born about 1022, was the second son of Godwin, Earl of Kent. On the death of Edward the Confessor, Jan. 5, 1066, he stepped without opposition into the vacant throne, without attending to the claim of Edgar Atheling or the asserted bequest of Edward in favor of the Duke of Normandy. The latter immediately called upon him to resign the crown, and upon his refusal prepared for invasion. He also instigated Harold's brother, Tostig, to infest the N. coasts of England in conjunction with the King of Norway. The united fleets of these chiefs sailed up the Humber and landed a numerous body of men; but at Stamford Bridge, in Yorkshire, were totally routed by Harold, whose brother Tostig fell in the battle. Immediately after he heard of the landing of the Duke of Normandy at Pevensey, in Sussex. Hastening thither with all the troops he could muster, a general engagement ensued at Senlac near Hastings, Oct. 14, 1066, in which Harold was slain, and the crown of England passed to William.

HAROLD I., surnamed HAARFAGER (Fair-haired), the first king of all Norway. He was the son of Halfdan the Black, the most powerful of the jarls or petty kings of southeastern Norway. According to the popular story, he loved a high born maiden named Gyda, but she declared she would not be his wife till he was sole king of Norway; he in his turn thereupon took an oath that he would neither cut nor comb his hair till he had accomplished her bidding. After a severe struggle of some years' duration (863-872) he subdued, first the chiefs between Throndhjem and the Sogne Fjord, and finally the kings of the S. W., whom he defeated in a naval battle near Stavanger. The conquered districts he placed under the rule of his own jarls, or such as were devoted to his service. This led many of the old nobles to emigrate to the Orkneys, the Hebrides, and to Iceland, whence they conducted a series of piratical expeditions against Norway, till at length Harold was constrained to sail W. and chastise them in their own seas. In his old age Harold divided his territories among his sons, and died at Throndhjem, which he had made his capital, in 930, leaving the supreme power to his son Eric, surnamed Bloody-Axe.

HAROLD III., surnamed HAARDRAADE, or HARDRADA (stern in council), a king of Norway. He was one of the most famous of the old Viking chiefs, and a descendant of Harold I. While still a boy he was present at the battle of Stikklestad (1030), in which his brother, St. Olaf, King of Norway, was slain. Harold himself sought an asylum at the court of his relative, Yaroslaff, Prince of Novgorod. Thence, going on to Constantinople, he became captain of the Varangians or Scandinavian bodyguard of the Greek emperors, and in command of them defeated the Saracens in several battles in Sicily and Italy. On his return to Constantinople he drew upon himself the vengeance of the Empress Zoe, whose proffered love he rejected, and with difficulty made good his escape to Russia, where he married the daughter of Duke Yaroslaff. But he did not remain in Russia. He returned about 1045 to Norway, where his nephew, Magnus (the son of St. Olaf), agreed to divide the supreme power with him, in exchange for a share of his treasures. The death of Magnus in 1047 left Harold sole king of Norway, and Svend King of Denmark; but with Svend Harold waged unrelenting war till 1064. This king changed the capital of Norway from Throndhjem to Opslo, now a suburb of Christiania. Two years later he landed in England, to aid Tostig against his brother Harold, King of England, but was slain in battle at Stamford Bridge, where also the flower of his warriors fell.

HAROUN (här-ön') surnamed AL-RASCHID (more properly Harún er Rashid the orthodox), the most renowned of the Abbaside caliphs; born in 763. He succeeded his elder brother, El Hádi, in the caliphate, in the year 786. He owed his peaceful accession to the sagacity of the Barmecide Yahya, whom he at once made his grand vizier. To him and his four sons he left the entire administration of his extensive kingdom, and the prosperity of the country proved that his confidence was not misplaced. Meantime Haroun gave himself up to the pleasures of life, and made his court at Bagdad a brilliant center of all the wit, learning and art of the Moslem world. Toward the end of his reign a strange and deeply rooted hatred toward the Barmecides filled his mind, and in 803 he caused the vizier, his four sons, and all their descendants, save one, to be executed, not even excepting his favorite Jaafer (Giafar), who had been his constant companion in his famous but apocryphal nocturnal rambles through the streets of Bagdad. But the retribution of heaven quickly followed; his affairs fell into irretrievable confusion; treason and rebellion showed themselves in every corner of the empire; and, when it was too late, Haroun repented bitterly his ferocious cruelty. To quell a formidable rising in Khorassan, in the N. E. of the empire, Haroun marched in person against the rebels, but an attack of apoplexy obliged him to remain behind, in Tûs, where he soon afterward died, in the month of March, 809. Haroun the Magnificent is the hero of many of the stories in the "Arabian Nights."

HARPER, GEORGE McLEAN, an American educator, born at Shippensburg, Pa., in 1863. He graduated from Princeton in 1884. After several years of newspaper work he became instructor of romance languages at Princeton University, in 1889. He was assistant professor in 1891, and professor in 1894. He was appointed professor of English literature in 1900. He was the author of "The Legend of the Holy Grail" (1896); "Masters of French Literature" (1901); "William Wordsworth, His Life, Works and Influences" (1915). He also edited and translated works of foreign authors. In 1918 he edited the addresses of President Wilson. He was a member of the National Institute of Arts and Letters, and was the delegate of the American Commission for Relief in Belgium, in 1919.

HARPER, WILLIAM RAINEY, an American educator; born in New Concord, O., July 26, 1856; was graduated at Muskingum College in 1870; Professor of Hebrew at the Baptist Union Theological Seminary, Chicago, in 1879-1886; of Semitic Languages at Yale College in 1886-1891; was then chosen president of the University of Chicago. He is the author of "Elements of Hebrew"; "Elements of Hebrew Syntax"; "Hebrew Vocabularies" and "An Introductory New Testament, Greek Method" (with Revere F. Weidner); "The Prospects of the Small College"; "Elements of Latin" etc. He died Jan. 10, 1906.

HARPERS FERRY, a town in Jefferson co., W. Va.; at the confluence of the Shenandoah and Potomac rivers, and on the Baltimore and Ohio railroads; 81 miles W. of Baltimore, Md. The place has considerable historical interest. It was the site of a United States government foundry, arsenal and armory, and the scene of John Brown's raid in Virginia in 1859. The government buildings were burned in 1861, to prevent their falling into the hands of the Confederates. In 1862 a Union army under Gen. D. H. Miles surrendered to Stone-

wall Jackson at this point. It is the seat of Storer College, and has considerable local trade. Pop. about 1,000.

HARPY, a fabulous creature in Greek mythology, considered as a minister of the vengeance of the gods. Various accounts are given of the numbers and parentage of the Harpies. Homer mentions but one, Podarge; Hesiod enumerates two, Aëllo and Okypete, daughters of Thaumas by the Oceanid Electra, fair-haired and winged maidens, very swift of flight. Three are sometimes recognized by later writers, who call them variously daughters of Poseidon or of Typhon, and describe them as hideous monsters with wings, of fierce and loathsome aspect, with their faces pale with hunger, living in an atmosphere of filth and stench, and contaminating everything that they approached. Vergil locates them in the Strophades. A harpy in heraldry is represented as a vulture, with the head and breast of a woman.

HARRADEN, BEATRICE, an English novelist, daughter of an East India agent in London; born about 1864. After private schooling and a season in Germany, she took her degree at London University at 21. She was then employed in a publishing house, but ill health compelled her to leave. Her first novel, "Ships That Pass in the Night," was instantly successful. This was followed by "In Varying Moods," "Things Will Take a Turn," "Hilda Strafford," "The Fowler," "The Scholar's Daughter" (1906); "Interplay" (1908); "Out of the Wreck I Rise" (1912); "Where Your Heart Is" (1918).

HARRIGAN, EDWARD, an American actor and playwright; born in New York, in 1845. He formed a partnership with Tony Hart (1871-1885), when the two opened in New York their first Theatre Comique (1876), bringing out there the "Mulligan Guard" series of plays. Among his dramas, which are all of humble New York life, strong in character drawing, though weak in a literary sense, may be named "Squatter Sovereignty" and "Cordelia's Aspirations." In 1903-1904 he produced "Under Cover." He died in 1911.

HARRIMAN, EDWARD HENRY, an American financier and railroad official, born at Hempstead, N. Y., in 1848. He was educated in the public schools and at Trinity School, New York City. Entering commercial life at the age of fourteen, he advanced rapidly, and was a member of the Stock Exchange when barely past his majority. He was the founder of the banking and brokerage house of Harriman & Co. In 1883 he became identified with the Illinois Central railroad as a director, proceeding, in 1887, to the vice-presidency. From this position, he began his organizing and consolidating operations, which extended to the acquisition of the Central and Southern Pacific roads in 1897-1898 and of the connecting lines to the Pacific Coast. His next step was thwarted by J. J. Hill and resulted in the Stock Exchange panic in 1901, after Harriman had failed to gain control of the Great Northern. Harriman was, if not the originator, at least one of the most noteworthy exponents of the use of "watered stock," as the subsequent investigations of the Interstate Commerce Commission revealed, notably in the Chicago and Alton railroad deal in 1901. He was actively interested in politics, and although a heavy contributor to the Roosevelt campaign fund of 1904, his financial methods led Roosevelt to break with him later. Many times prosecuted by the Federal government under the Sherman Act, Harriman was able to maintain his operations and actually increase his grip upon the railroad system of the country. He died in 1909, leaving an estate of over $200,000,000 to his wife.

HARRIS, SIR AUGUSTUS GLOSSOP, an English actor, manager, and dramatist; born in Paris, in 1852. Appearing on the stage in 1873, in 1879 he became lessee and manager of Drury Lane Theater, where he produced popular pantomimes and melodramas written in collaboration — among them: "The World"; "Youth"; "Human Nature"; "Run of Luck"; "Prodigal Daughter"; "Life of Pleasure"; "Derby Winner." He induced the revival of grand opera at Covent Garden. He was made sheriff of London and knighted in 1891. He died in Folkestone, England, Jan. 22, 1896.

HARRIS, CORRA MAY (WHITE), an American writer, born at Farm Hill, Ga., in 1869. In 1887 she married Rev. Lundy Howard Harris. She began writing in 1899. Her published books include "The Jessica Letters" (1904); "A Circuit Rider's Wife" (1910); "Eve's Second Husband" (1910); and "In Search of a Husband" (1913). She visited Europe during the World War and contributed articles to the "Saturday Evening Post."

HARRIS, FRANK, an editor and writer, born in Galway, Ireland, 1854. In 1870 he came to the United States where he studied in the University of Kansas. Later he was also a student in half a dozen European universities,

but took no degrees in any of them. In 1875 he was admitted to the Kansas bar, but did not practice, returning to Europe shortly after. He became editor of the London "Evening News" and the "Fortnightly Review," and later owner and editor of the "Saturday Review." He was intimately acquainted with the most prominent literary celebrities of Great Britain and wrote one of the most enlightening books on the life of Oscar Wilde (Life and Confessions of Oscar Wilde, 1916). Later he returned to the United States and took over the ownership and editorship of "Pearson's Magazine," of New York City. Among his works are: "The Bomb" (1886-1909); "The Man Shakespeare" (1909); "Unpathed Waters" (1913); and "Great Days" (a novel, 1914).

HARRIS, JOEL CHANDLER, an American journalist and story writer; born in Eatonton, Ga., Dec. 8, 1848. He began life as a printer's apprentice, and afterward studied law, drifting finally into journalism. He had a thorough familiarity with the negro of the post-bellum period, and while editing an Atlanta paper he produced for it the series of "Uncle Remus" sketches and songs which immediately made him known. "The Folk-Lore of the Old Plantation" appeared in 1880, followed by "Nights with Uncle Remus" (1883); "Mingo and Other Sketches" (1883); "Daddy Jake, the Runaway" (1889); "On the Wings of Occasion" (1900); "Told by Uncle Remus" (1905); "Uncle Remus and Br'er Rabbit" (1907). He died in 1908.

HARRISBURG, a city of Illinois, the county-seat of Saline co. It is on the Cleveland, Cincinnati, Chicago, and St. Louis and the Southern Illinois Railway and Power Company railroads. It is the center of an important agricultural and coal mining region. Its industries include flour mills, wagon shops, sawmills, etc. It has a library, a post office, and other important public buildings. Pop. (1910) 5,309; (1920) 7,125.

HARRISBURG, a city, capital of the State of Pennsylvania, and county-seat of Dauphin co.; on the Susquehanna river, the Pennsylvania canal, and on the Pennsylvania, the Philadelphia and Reading, the Cumberland Valley, and the Northern Central railroads; 160 miles W. of Philadelphia. It is a railroad center with direct connections with the coal and iron resources of the State, and is an extensive lumber depot.

Public Interests.—The city is well laid out, lighted with electricity, and surrounded by magnificent scenery. The State capitol buildings are located in the midst of a beautiful park of 10 acres on a gentle rise of ground. The Capitol is one of the most magnificent buildings in the world. Other points of interest are Fort Washington, just across the Susquehanna river, marking the most northern point of the Confederate advance; Gettysburg, with its famous battlefield, 46 miles to the south; the Executive Mansion, 313 North Front street; the Rockville four-track railroad bridge, five miles to the north, the largest stone arch bridge in the world; Hershey Park and the model town of the Hershey Chocolate Company, 12 miles to the east, and the beautiful Masonic Home at Elizabethtown, 17 miles away. The educational institutions include 35 public schools, two junior high schools, and many private schools. The total enrollment in 1920 was over 13,000. Harrisburg is the seat of a Roman Catholic bishop, and its charitable organizations include several hospitals, the Home of the Friendless, and the Children's Industrial Home. It has electric street railway connections with neighboring towns.

Business Interests.—The iron, steel, and lumber industries are of great importance. The leading manufactures are machinery, boilers, bricks, castings, brooms, cars and coaches, tanned leather, lumber, cotton goods, iron, steel, tin plate, shoes, clothing, and flour. Much trade is carried on in butter, hay, and other farm products. In 1919 there were 4 National banks and several private banking houses with total resources of $31,000,000. The clearings in 1919 were $154,767,943. The assessed property valuation in 1919 was $62,500,000.

History.—Harrisburg was founded by John Harris in 1785; was incorporated as a borough in 1791; became the State capital in 1812; and received its charter as a city in 1860. Pop. (1910) 64,186; (1920) 75,917.

HARRISON, a city in Hudson co., N. J., on the Passaic river, opposite Newark, with which it is connected by several bridges; and on the Pennsylvania, the Lackawanna, and the Erie railroads. It has extensive manufactures of cotton, thread, electric supplies, wire cloth, harness, trunks, leather goods, steam launches, iron and steel ordnance, and furniture, foundries, breweries, slaughter houses, etc. There are electric lights, and street railways, daily and weekly newspapers, public library, high school, and an assessed property valuation of $4,000,000. Harrison was settled in 1668, and incorporated in 1873. Pop. (1910) 14,498; (1920) 15,721.

HARRISON, BENJAMIN, an American patriot; born in Berkeley, Va., about 1740. He was elected to the House of Burgesses soon after attaining his majority. In 1773 he was chosen a member of the committee which united the colonies against Great Britain. Shortly afterward he was elected to Congress and five times re-elected. On July 4, 1776, he reported, as chairman of the committee of the whole House, the Declaration of Independence, of which he was one of the signers. He opposed the ratification of the Federal Constitution, but, on its adoption, supported the National government. He died in April, 1791.

HARRISON, BENJAMIN, an American statesman, 23d President of the United States; born in North Bend, O., Aug. 20, 1833. He was a great-grandson of Benjamin Harrison, signer of the Declaration of Independence, and grandson of William Henry Harrison, 9th President of the United States. He was graduated at Miami University; studied law in Cincinnati; removed to Indianapolis, Ind., in 1854, and laid the foundation of a fine legal practice; entered the Union army in 1862, serving with conspicuous gallantry in the Atlanta campaign, finally returning to civil life at the close of the war with the rank of brevet Brigadier-General; was the Republican candidate for governor of Indiana in 1876, but was defeated; was elected to the United States Senate in 1881, where he added to his reputation as a sound thinker and a polished debator; at the Republican Convention held in Chicago, June, 1888, he was nominated for the presidency of the United States; elected in the ensuing November; and inaugurated March 4, 1889. His administration was quiet, successful, and measurably popular. It was marked by the amicable settlement of the trouble with Chile and by the passage of the McKinley Tariff Bill. In 1892 he received again the nomination in the National Republican Convention, but by this time the able and persistent attacks of the Democracy on the high tariff policy led to a general revulsion against it, and he was defeated at the election by Cleveland. He thereupon pursued a private law practice, occasionally giving public addresses. He died in Indianapolis, Ind., March 13, 1901.

HARRISON, MRS. BURTON (CONSTANCE CARY), an American novelist and miscellaneous writer; born in Vaucluse, Va., April 25, 1846. She wrote: "Woman's Handiwork in Modern Homes" (1881); "Old-Fashioned Fairy-Book" (1884); "Bar Harbor Days" (1887); and the novels "The Anglomaniacs"; "An Errant Wooing"; "A Bachelor Maid"; "A Son of the Old Dominion" (1897); "A Princess of the Hills" (1901); a play, "The Unwelcome Mrs. Hatch" (1901); "Recollections Grave and Gay" (1911).

HARRISON, CARTER HENRY, an American public official, born in Chicago in 1860. He graduated from St. Ignatius College in 1881 and afterward studied law at Yale. He engaged in the real-estate and publishing business in Chicago and was elected mayor of that city for 5 terms from 1897 to 1905 and from 1911 to 1915. During the World War he was in charge of the American Red Cross activities in 12 hospitals in France.

HARRISON, FRANCIS BURTON, an American public official, born in New York City in 1873. He graduated from Yale in 1895. He served during the Spanish-American War as a member of the New York Volunteer Cavalry. In 1903 he was elected to Congress and was re-elected in 1906 and in 1913. He resigned in the latter year to become governor-general of the Philippine Islands.

HARRISON, FREDERIC, an English writer; born in London, Oct. 18, 1831. He was educated at King's College School, London, and Wadham College, Oxford. A Positivist in religion and an advanced Liberal in politics, he argued his opinions in many vigorous and well-written articles in the magazines and reviews. Of his works the chief are "The Meaning of History" (1862); "Order and Progress" (1875); "The Present and the Future" (1880); "Lectures on Education" (1883); "On the Choice of Books" (1886); "Oliver Cromwell" (1888); "The Meaning of History" (1894); "Literary Essays" (1895); and "William the Silent" (1897); "Creed of Layman" (1907); "Among My Books" (1912) "The German Peril" (1915) etc.

HARRISON, MARY ST. LEGER (LUCAS MALET), an English novelist, daughter of Charles Kingsley, born in Eversley, Hampshire, married to the Rev. William Harrison. Her books acquired a wide popularity in England and in the United States. Among the best known are: "Colonel Enderby's Wife" (1885); "The Wages of Sin" (1891); "The Golden Galleon" (1910); and The "Wisdom of Damaris."

HARRISON, WILLIAM HENRY, an American statesman, 9th President of the United States; born in Berkeley, Va., Feb. 9, 1773. He served in the Indian War on General Wayne's staff, 1791-1792, and in 1797 was appointed captain,

in command of Fort Washington, on the present site of Cincinnati, O. On the conclusion of the war, he became Secretary of the Northwest Territory (1798), resigning the next year to enter Congress as delegate from that Territory. In 1801 he was appointed governor of Indiana Territory, and made superintendent of Indian Affairs. He made important treaties with the Indians, and won considerable fame by a victory over a force of Indians, in the battle of Tippecanoe, in 1811. In 1812 he was intrusted with full military command on the Northwest frontier, with the rank of Brigadier-General, and the following year was promoted to Major-General. During this year he distinguished himself by his defense of Fort Meigs, and in the battle of the Thames. After the War of 1812, he was sent to Congress, 1816; to the Ohio State Senate, 1819; to to United States Senate, 1825; and as United States minister to Columbia, 1828. After a retirement of 12 years, he was nominated for the presidency by the Whig party, against Van Buren, in the famous "log-cabin" and "hard cider" campaign. Harrison was said by his opponents to live in a log cabin and to be given to the habit of drinking hard cider. These reproaches were turned into watch-words by the Whigs, and aroused unprecedented enthusiasm. He died April 4, 1841, just a month after his inauguration, leaving the presidency to the Vice-President, John Tyler.

HARROW, or **HARROW-ON-THE-HILL**, an English town in Middlesex. Its "visible church," which crowns the hill-top, was founded by Lanfranc, and rebuilt about the middle of the 14th century.

HARROW SCHOOL was founded in 1571 by John Lyon, a wealthy yeoman, who died in 1592; but the original red brick school house (now the Fourth Form School) was not built till 1608-1615. New buildings have been added since 1819, the chief of these being the Second-pointed chapel (1857), the Vaughan Memorial Library (1863), and the semicircular Speech-room (1877). The school was primarily intended to afford a free education to 30 poor boys of the parish; but the statutes, drawn up by the founder two years before his death, provided also for the admission of "so many foreigners as the place can conveniently contain" and it is to that provision that Harrow, though not richly endowed, owes its proud position among the great schools of England. The age of admission is 12 to 14; and there are six or seven entrance scholarships, of from $150 to $400 per annum, offered every Easter. Of leaving scholarships, the most valuable are Baring's three of $500 a year for five years to Hertford College, Oxford. Under the Public Schools Act of 1868 the governing body comprises six members, elected respectively by the Lord Chancellor, the universities of Oxford, Cambridge, and London, the Royal Society, and the undermasters.

HART, ALBERT BUSHNELL, an American educator; born in Clarksville, Pa., July 1, 1854; became Professor of History at Harvard University. He wrote "Coercive Powers of the United States Government" (1885); "Introduction to the Study of Federal Government" (1890); "Studies in Education"; "Life of Salmon P. Chase"; "Practical Essays on American Government"; "Essentials of American History" (1905); "The Southern South" (1911); "The War in Europe" (1914); "National Progress" (1918). Edited "Epochs of American History," etc. Exchange professor of Harvard with University of Berlin (1915).

HARTE, FRANCIS BRET, an American novelist and poet; born in Albany, N. Y., Aug. 25, 1839. He went to California in 1854, and figured as a coal dealer, a teacher, and a typesetter on the "Golden Era," in which appeared some of his earliest literary efforts. He next became editor of the "Californian," and in 1864 secretary to the United States Mint at San Francisco; in 1868 he became editor of the "Overland Monthly," in which appeared, in 1869, the humorous poem of "The Heathen Chinee." In 1878 he became United States consul at Crefeld, whence he was transferred to Glasgow in 1880, and remained there till 1885. Among his best known works are "The Luck of Roaring Camp"; "The Outcasts of Poker Flat"; "The Argonauts of '49"; "Two Men of Sandy Bar"; "Gabriel Conroy"; "Mrs. Skagg's Husbands"; "East and West Poems"; "In the Carquinez Woods"; "Maruja, a Novel"; "Crusade of the Excelsior"; "A Waif of the Plains"; "A Ward of the Golden Gate"; "A Sappho of Green Springs"; "Susy"; "Three Partners"; "Tales of Trail and Town"; "Under the Redwoods"; etc. He died May 5, 1902.

HARTFORD, a city, capital of the State of Connecticut, port of entry and county-seat of Hartford co.; on the Connecticut river and on the New York, New Haven and Hartford, and the New England and New York railroads; 36 miles N. E. of New Haven. It is an important commercial and manufacturing city, and

besides it is noted for its many insurance companies. Area, 17 square miles.

Public Interests.—The city is lighted by electricity, has a waterworks system with 115 miles of mains owned by the city, 115 miles of streets, of which 84 miles are paved, and 89 miles of sewers. It is the seat of Trinity College, Hartford Congregational Theological Seminary, American Asylum for the Deaf, Insane Retreat, Old People's Home, and the High School, Young Men's Christian Association building. There are a Roman Catholic Cathedral (St. Joseph's), and many elegant churches, a large free public library, and several valuable libraries connected with the educational institutions of the city. The City Hall and Capitol Buildings are the two most famous buildings in Hartford. The former was used as a State House for nearly 100 years and housed the famous Hartford Convention. Near the City Hall is the Center Church, which was constructed in 1807, and has adjoining a burying ground which was in use from 1640 to 1803. Opposite is the Wadsworth Atheneum, containing the Connecticut Historical Society, the Hartford Public Library, and the Morgan Memorial. These three are noted buildings in Hartford, and contain many works of art, rare collections of paintings and books. A few blocks away from the center of the city is a tablet which marks the site of the Charter Oak, a famous old tree, in the hollow of which was hidden the Connecticut Charter to save it from Sir Edmund Andros. The State House is an imposing structure completed in 1880 at a cost of $3,100,000, having its main approach by way of a bridge over Park river, on which bridge a soldiers' memorial arch has been built.

Business Interests.—The city's manufactures are varied and extensive, including machinery, tools, firearms, bicycles, carriages, sewing machines, typewriters, nails, boilers, engines, hosiery, brass goods, woolens, tobacco, silver and plated ware, stoneware, etc. In 1919 there were 4 National banks. The exchanges at the United States clearing house during 1919 amounted to $427,118,000.

History.—The first settlement was made by the Dutch in 1623, but it was not till 1636 that a permanent settlement, called Newton, was made by the English. The name was changed to Hartford in 1637. The Dutch were banished from Connecticut in 1654, and in 1687 an attempt was made by the English Governor Andros to seize the Charter, which was thwarted by hiding it in the Charter Oak. The city was incorporated in 1784 and became the State capital in 1873. Pop. (1910) 98,915; (1920) 138,036.

HARTFORD CITY, a city of Indiana, the county-seat of Blackford co. It is on the Pittsburgh, Cincinnati, Chicago and St. Louis, and the Lake Erie and Western railroads. It is the center of an important natural gas and oil region and has manufactures of paper, tile, brick, wagons, and glass. Pop. (1910) 6,187; (1920) 6,183.

HARTFORD THEOLOGICAL SEMINARY, an institution for theological education, founded in 1834, at East Windsor Hill, Conn., as The Theological Institute of Connecticut. It was removed in 1865 to Hartford, and its name was changed to Hartford Theological Seminary. It was affiliated in 1902 with the Hartford School of Religious Pedagogy. It includes a department of missions, known as the Kennedy School of Missions in memory of John Stewart Kennedy. The library contains over 100,000 volumes. In 1919 there were 12 instructors and 48 students. President, W. D. MacKenzie, D. D.

HARTLEPOOL, an English seaport in the North Sea, consisting of Hartlepool proper and former West Hartlepool, separated by Hartlepool Bay. A parliamentary borough of Durham County. The first harbor was constructed at West Hartlepool in 1847, of 12 acres, and has since been greatly enlarged. The dock area of Hartlepool and West Hartlepool together, including the timber and shipbuilding yards, etc., is over 300 acres in extent. Extensive iron shipbuilding yards, cement works, wood pulp works, and marine engine building establishments have been established. Governed from 1854 by a local commission, the town was created a municipal borough in 1887. Pop. of municipal borough about 85,300. Hartlepool was bombarded by the Germans in 1914.

HARTMANNSWEILERKOPF, a village of Alsace, situated on a hill, which was a center of fighting during the World War. Following the French thrust into Alsace at the beginning of the war it was captured by the Germans Jan. 21, 1915, and recaptured by the French, March 27, who lost it again on April 25 only to retake it three days later. It changed hands repeatedly, but was permanently held by the French after Oct. 16, 1915.

HARTY, JEREMIAH J., a Roman Catholic archbishop, born in St. Louis, Mo., in 1853. He was educated in St. Louis University, and St. Vincent's College. He was ordained to the priesthood

in 1878. He served as rector in churches in St. Louis and organized the parish of St. Leo's in that city. He served as pastor in that church until his appointment as Archbishop of Manila in 1903. He afterward became bishop of Omaha.

HARTZ. See HARZ MOUNTAINS.

HARUN AL-RASCHID. See HAROUN.

HARVARD, JOHN, an American clergyman; born in England in 1607. He was graduated at Emmanuel College, Cambridge, England, and came to the United States in 1637. He was made a citizen of Massachusetts and given a tract of land in Charlestown, where he began preaching as a Congregational minister, and in his will bequeathed $3,750 and 320 volumes from his library for the establishment of a college. A granite monument was erected over his remains in Charlestown in 1828, and a memorial statue on the Delta at Harvard University was unveiled in 1884. See HARVARD UNIVERSITY.

HARVARD OBSERVATORY, in Cambridge, Mass., founded in 1843, equipped with a 15-inch Merz & Mahler equatorial in 1847, with an 8¼-inch Troughton & Simms meridian-circle in 1870, with various photometers by Professor Pickering since 1876, and with a large number and variety of photographic telescopes, a part of the largest of them being loaned to the observatory by Mrs. Henry Draper since 1835. It is the richest endowed and in some respects (especially photographically) the best equipped observatory in the world.

HARVARD UNIVERSITY, the oldest institution of learning in the United States, founded in Cambridge, Mass., 3 miles from Boston, in 1636. At a meeting of the General Court of the Colony of Massachusetts Bay convened on Sept. 8, only six years after its first settlement, it was voted to give £400 toward a "schoale or colledge," and the ensuing year 12 of the most eminent men of the colony, including John Cotton, and John Winthrop, were authorized "to take order for a college at Newtown." The name of Cambridge was soon afterward adopted in recognition of the English University, where many of the colonists had been educated. In 1638 John Harvard, a young non-conformist minister, died in Charlestown, leaving to the college £750, and his entire library of 300 volumes. The institution was immediately opened, and was named after its benefactor. Its first president was the Rev. Henry Dunster.

Between 1636 and 1782 Harvard College conferred only the degrees of Bachelor and Master of Arts, but in 1780 the term University was applied to it in the constitution of Massachusetts. In 1782 and 1783 three professorships of medicine were established and the first degree of Bachelor in Medicine was conferred in 1788. In 1810 the lectures in medicine were transferred to Boston, and there the first medical college was built in 1815. The Law School was established in 1817, and has the distinction of being the earliest school in the country connected with a university and authorized to confer degrees in law. The Divinity School was a gradual outgrowth of the college; the Hollis professorship of Divinity was established in 1721, but the divinity faculty was not formally organized till 1819. It is undenominational—no assent to the peculiarities of any denomination of Christianity being required of any instructor or student. These were the three oldest additions to the college, and justified the wider title.

The Scientific School instituted in 1847, and at first announced as an advanced school in science and literature, was named after Abbott Lawrence, who presented it with $50,000. It confers the degree of Bachelor of Science. The Graduate School, established in 1872, and placed in 1890, together with the Lawrence Scientific School, under the Faculty of Arts and Sciences, confers also the degrees of Master of Arts, Master of Science, Doctor of Philosophy, and Doctor of Science. The Dental School, situated in Boston, was instituted in 1867, its course being three years; it gives the degree of Doctor of Dental Medicine. The School of Veterinary Medicine was established in 1882, has a free clinic, a hospital, a pharmacy and shoeing forge, and its course of three years leads to the degree of D. V. M. The Arnold Arboretum was founded in 1872 as the outcome of the will of James Arnold, and is practically a public park of great beauty and an experiment station in Arboriculture, Dendrology and Forestry. The school of Agriculture and Horticulture was established in 1870 in accordance with the will of Benjamin Bussey, and is known as the Bussey Institution. It confers the degree of Bachelor of Agricultural Science. The Astronomical Observatory was established in 1843 by means of a public subscription; the Sears Tier was built in 1846, and two years later Edward Bromfield Phillips bequeathed to the university the sum of $100,000 for the observatory. A branch station is established on a mountain 8,000 feet high, near Arequipa, Peru. Among the more important instruments are the 15-inch and 6-inch equatorial telescopes, the 8-inch transit-circle, the 11-inch Draper photographic telescope, the 8-

inch photographic telescope, and the meridian photometer. In 1914 the university was divided into the Faculty of Arts and Sciences, the Faculty of Divinity, the Faculty of Law, the Faculty of Medicine and the Faculty of Applied Science.

Among the other establishments belonging to the university are the Museum of Comparative Zoölogy (1850); the Botanical Museum; the Mineralogical Museum; the Natural History Laboratories; the Peabody Museum of American Archæology and Ethnology, founded in 1866 and transferred to the university in 1897; the Semitic Museum founded in 1889; the William Hayes Fogg Art Museum, founded in 1895, and containing, among other treasures the Gray engravings and the Randall engravings; the Botanic Garden, founded in 1807, and the Gray Herbarium, presented to the University in 1864; and Radcliffe College, brought into official relation with the university in 1894. Besides the various department libraries, more than a dozen in number, there is a University Library kept in Gore Hall, numbering 700,000 volumes, and as many maps and pamphlets. In 1764 the library was destroyed by fire, the only works saved being an Oriental collection bequeathed by Dr. Lightfoot, and the Greek and Roman classics presented by Bishop Berkley.

The university buildings number more than 60, including the great Memorial Hall, built in honor of the alumni who perished in the Civil War. In 1909 Charles W. Eliot retired after 40 years as president, and was succeeded by A. Lawrence Lowell. In 1919 the faculty numbered 827, and the students 4,891.

HARVEST MOON, the moon near its full at the time of harvest, or about the autumnal equinox, when it rises at nearly the same hour for several days, owing to the small angle of the ecliptic and the moon's orbit.

HARVEY, a city of Illinois, in Cook co. It is on the Illinois Central, the Grand Trunk, the Baltimore and Ohio, and other railroads, and on the Calumet river. The city is a residential suburb of Chicago. It is, however, an important industrial center. It has manufactures of mining machinery, gas stoves, automobiles, cement, railroad supplies, etc. It has a public library and other important public buildings. Pop. (1910) 7,227; (1920) 9,216.

HARVEY, GEORGE BRINTON McCLELLAN, an American publisher and editor, born in Peacham, Vt., 1864. He was successively connected with the reportorial staffs of the "Springfield Republican," the "Chicago News," and the New York "World." He was also the promoter and the president of a number of electrical railway corporations. At one time he was president of the publishing firm of Harper & Bros. In 1899 he became editor of the "North American Review." He was appointed ambassador to Great Britain in March, 1921. He was the author of "Women" (1908); and "The Power of Tolerance" (1911).

HARVEY, WILLIAM, an English physician; born in Folkestone, Kent, April 1, 1578. He took his degree in arts at Caius College, Cambridge, in 1597 and after five years' study at Padua, he obtained his diploma as doctor of medicine in 1602. After receiving his doctor's degree from his original university, Cambridge, he settled in London as a physician. In 1609 he was appointed physician to St. Bartholomew's Hospital, and in 1615 Lumleian Lecturer at the College of Physicians—an office then held for life; and it is generally supposed that in his first course of lectures (in the spring of 1616) he expounded those original and complete views of the circulation of the blood with which his name is indelibly associated. It was not till the year 1628 that he gave his views to the world at large, in his celebrated treatise entitled, "Anatomical Study of the Movement of the Heart and the Blood." He was appointed successively physician to James I. and Charles I. Harvey's first step was to prove that the arteries contained not air but blood. He attended the king in his various expeditions, and was present with him at the battle of Edgehill (Oct. 23, 1642). On the surrender of Oxford to the Parliament July, 1646, he left the university and returned to London. In 1654 he was elected president of the College of Physicians, but he declined the office on account of his age and infirmities. In July, 1656, he resigned his Lumleian lectureship (held for more than 40 years); and in taking leave of the college presented to it his little patrimonial estate at Burmarsh, in Kent. He died at Hampstead, June 3, 1657.

HARZ MOUNTAINS (harts), a mountain range of Germany, extending between the rivers Weser and Elbe, S. of Brunswick, with a length of 57 miles, a breadth of 20, and a superficial area of 900 square miles. It forms an elevated plateau, rising on most sides somewhat steeply from the plains. The range, which is divided into Upper and Lower Harz, the average elevations of which are 2,100 and 1,000 feet, respectively, is composed for the most part of rocks belonging to the Devonian and Lower Car-

boniferous formations, and broken through in a few places by granite, as in the Brocken, the highest peak (3,740 feet) of central Germany. The Harz are exceedingly rich in metals and minerals, as silver, iron, lead, copper, zinc, marble, alabaster, and granite. These mountains form a natural line of division between the Low German and the High German races. Industries connected with the mines and the forests, as well as some cattle-breeding and agriculture, afford employment to the inhabitants. The rearing of singing birds is also a source of profit. The region is rich in historic and legendary interest.

HASDRUBAL (haz'drö-bal), the name of several Carthaginian generals, of whom the most famous was the son-in-law of Hamilcar Barca. In 237 B. C. he accompanied Hamilcar into Spain, and gave that general most effective aid in the work of building up a Carthaginian dominion in the Peninsula. On the death of Hamilcar in 228 B. C. the task of administering and extending the new empire devolved on Hasdrubal, who advanced the Carthaginian frontier from the Bætis (the Guadalquivir) to the Tagus, and founded a new capital, Nova Carthago (the modern Cartagena), a city with the best harbor on the S. E. coast of Spain, and situated in the vicinity of rich silver mines. Hasdrubal proved himself an admirable administrator. He was remarkably successful in conciliating the Iberian tribes, and extended his rule mainly by peaceful means. So independent was he of the home government that the Romans made a treaty in which the Ebro was fixed on as the frontier line, not with Carthage, but with Hasdrubal. In the eighth year of his command, 221 B. C., he was assassinated by a Celtic slave. Another HASDRUBAL was the son of Hamilcar Barca and the brother of Hannibal. He defeated Cneius Scipio in Spain in 212 B. C., and in 208 marched through Gaul, to join his brother Hannibal in Italy. He crossed the Alps in favorable weather, but, instead of pushing S. made a fatal delay at Placentia, and was surprised and slain on the Metaurus in 207 B. C. A third HASDRUBAL was one of Hannibal's principal officers in the Italian campaigns. He made a brilliant charge at the battle of Cannæ, which contributed greatly to decide the fate of the day. A fourth general of the same name defended Carthage against the Romans during the siege which ended in the city's destruction in 146 B. C. He is accused of cowardice and cruelty, and of having starved the citizens while himself living in revelry.

HASSAM, CHILDE, an American artist, born in Boston, in 1859. He was educated in the public schools and studied art in Boston and in Paris. He was awarded a bronze medal at the Paris Exposition of 1889, and was afterward awarded many medals and prizes at other exhibitions. He was recognized as one of the most talented of modern American artists. He was a member of the American Water Color Society, and the American Institute of Arts and Letters.

HASSELT, capital of the Belgian province of Limburg, 18 miles N. W. of Maastricht, has several distilleries, manufactures linen fabrics, lace, and tobacco, and cultivates tobacco, madder, and chicory. In 1831 the Dutch defeated the Belgians here.

HASTINGS, a maritime town of England, in Sussex, 54 miles S. E. of London. It had formerly a good trade, now declining, but is resorted to as a fashionable watering place. Here the battle of Hastings, one of the most memorable events in the annals of English history, was fought between William, Duke of Normandy, and Harold II., King of England, on Oct. 14, 1066. Pop. about 65,000.

HASTINGS, a city of Michigan, the county-seat of Barry co. It is on the Thornapple river, and on the Michigan Central and the Chicago, Kalamazoo, and Saginaw railroads. It is an important industrial community and has flour mills, cigar factories, and manufactories of pumps, carriages, wagons, etc. Its public institutions include a public school library, and a city hall. Pop. (1910) 4,383; (1920) 5,132.

HASTINGS, a city in Adams co., Neb.; on the Burlington Route, the Chicago & Northwestern; the St. Joseph & Grand Island, and the Missouri Pacific railroads; 96 miles W. of Lincoln. It is the seat of Hastings College, the Chronic Insane Asylum, the Bethany Home and Hospital, and the Mary Lanning Hospital. It is an important grain shipping center and has vinegar works, foundries, flour mills, and other manufacturing industries. There are electric lights, waterworks, public library, high school, daily and weekly newspapers, and three National banks. Pop. (1910) 9,338; (1920) 11,647.

HASTINGS UPON HUDSON, a village of New York, in Westchester co. It is a residential suburb of New York, but has important industries, including the manufacture of copper-wire cable, copper, brass, paving bricks, dyestuffs,

chemicals, etc. Pop. (1910) 4,552; (1920) 5,526.

HASTINGS, WARREN, first Governor-general of India; born in Daylesford, Worcestershire, in 1732. He was educated at Westminster School, and in 1750 he set out for Bengal in the capacity of a writer in the service of the East India Company. When stationed at Cossimbazar he was taken prisoner by Surajah Dowlah on the capture of the place (1756). Having made his escape, he served as a volunteer under Clive in 1757. He was representative of the company at Moorshedabad from 1758 to 1761. In the latter year he removed to Calcutta, having obtained a seat in the Bengal Council, but returned to England in 1764. As he lost the bulk of his means by unfortunate Indian investments, he again entered the company's service, and sailed for India in 1769. In consequence of the misgovernment of the Nabob of Bengal the company had deprived him of all real power, and now wished to have the country more directly under their control. Warren Hastings was its chief instrument in this undertaking, and in 1772 became president of the Supreme Council of Calcutta. His administration during the succeeding twelve years aroused much criticism in England, and a motion for his recall was passed by the House of Commons. Fox's India Bill was thrown out in 1783, but next year Pitt's bill, establishing the board of control, passed, and Hastings resigned. He left India in 1785, and was impeached by Burke in 1786, being charged with acts of injustice and oppression, with maladministration, receiving of bribes, etc. This celebrated trial, in which Burke, Fox, and Sheridan thundered against him, began in 1788, and terminated in 1795 with his acquittal, but cost him his fortune. The company in 1796 settled on him an annuity of $20,000 a year, and lent him $250,000 for 18 years free of interest. He died in 1818.

HAT, the principal head covering of the human family, distinguished from the cap or bonnet by having a brim around it. The hat, as a roomy brimmed head-covering, is the direct descendant of the petasus of the ancient Greeks, which was distinguished from the other Greek head-gear, the pileus, by the possession of a brim, useful for protecting its wearer from the rays of the sun.

HATCHEE, or HATCHIE, a river, rising in Tippah co., Miss., passes through part of Tennessee, and enters the Mississippi river near Randolph. An action occurred at Davies' Bridge on this river, Oct. 6, 1862, between a Confederate force under General Van Dorn, and one of National troops under General Ord, in which the former were defeated with the loss of 300 prisoners and two batteries. Ord and Veatch were wounded during this battle.

HATCHERY, a house for hatching fish, etc.

HATTERAS, CAPE, a low point of North Carolina, forming part of a sandbank, in lat. 35° 15′ N. and lon. 75° 31′ W. The coast line here turns from the direction of N. E. to that of due N.; violent storms are frequent, and render navigation dangerous and the island is marked by a light raised 190 feet above the sea.

HATTIESBURG, a city of Mississippi, the county-seat of Forrest co. It is on the New Orleans and Northeastern, the New Orleans, Mobile, and Chicago, the Mississippi Central, and the Gulf and Ship Island railroads, and on the Leaf river. It is the center of an important lumbering region. Its other industries include railroad shops, woodworking plants, machine shops and manufacture of fertilizers, mattresses, etc. It is the seat of the Baptist Woman's College. Pop. (1910) 11,733; (1920) 13,270.

HAUCK, MINNIE, an American opera singer; born in New York City Nov. 16, 1852. Her first appearance was in concert in New Orleans when only 13 years old. She afterward studied with Errani in New York and made her operatic début in "La Somnambula" in 1868. She was uniformly successful both in the United States and European countries. She married the Chevalier de Hesse-Wartegg and retired in 1896.

HAUPTMANN, GERHART (houpt′män), a German dramatist and poet; born in Salzbrunn, Silesia, Nov. 15, 1862. He was a scholar of solid attainments at Jena and Berlin. His taste for practical sociology comes out strongly in his intense and powerful poems and dramas; he settled on a small Silesian farm solely to study peasant life. He traveled widely, visiting the United States in 1894. His first play, "Promethidenlos" (1885) was conventional; but under Ibsen's inspiration he soon broke away from the old lines, producing "Before Sunrise" and "A Family Catastrophe," tragedies of labor. These and subsequent plays gave him world-wide repute. He later turned to comedy, but "The Weavers" and its successors represent his forte. Among his later plays may be mentioned "Mathilde" (1902); "Ein-

hart der Lächler" (1907); "The Apostle," a novel (1902).

HAURAKI (hō-rä-'kē), a gulf and a gold-bearing peninsula of New Zealand, opposite Auckland.

HAURAN (hä-ran'), a large district in Syria, E. of the Sea of Galilee. The name is sometimes restricted to one fertile plain there.

HAUSSA, or **HOUSSA** (hō'sä), a people of the Sudan, who have been conquered by the Fulbé, and now constitute the larger part of the population in Sokoto, Adamawa, and Gando. Whether they are of pure Negro race, or an immigrant wave of ancient Hamitic stock, now indistinguishable from the Negroes, is not yet fully determined. Their language is allied in its grammatical forms with the Hamitic tongues to the E. and N., while its vocabulary resembles in many points that of the neighboring Negro tribes. At any rate the Haussa language is the common medium of communication in the commercial world of central Sudan. The Haussa themselves are keen traders, and also occupy themselves with agriculture and industrial pursuits (weaving, dyeing, tanning, etc., and the making of baskets, pottery, and iron imp ements). They have adopted Islam from their conquerors.

HAUSSONVILLE, GABRIEL PAUL OTHENIN DE CLÉRON COMTE D' (dōs'ôn-vēl), a French littérateur; born in Gurcy-le-Châtel, Seine-et-Marne, Sept. 21, 1843. He became a member of the French Academy, and one of the leading contributors to the "Review of the Two Worlds." His reputation rests on literary monographs among which are "Sainte Beuve, His Life and Works" (1875); "George Sand"; "Prescott," etc. (1879-1888); and works like "Across the United States" (1883), notes and impressions; "Social Studies" (1886); "Madame de La Fayette" (1891); "Lacordaire" (1896); "Duchesse de Bourgogne" (1901); "Paris Charitable et Bienfaisant" (1912), etc.

HAUTE-GARONNE. See GARONNE, HAUTE.

HAUTE-LOIRE. See LOIRE, HAUTE.

HAUTE-MARNE. See MARNE.

HAUTES and BASSES ALPES. See ALPES.

HAUTE-SAÔNE. See SAÔNE, HAUTE.

HAUTE-SAVOIE. See SAVOY.

HAUTE-VIENNE. See VIENNE, HAUTE.

HAVANA, a province of Cuba, in the western part of the island, from the Gulf of Mexico to the Caribbean Sea, bounded on the west by the province of Pinar del Rio, and on the east by the province of Matanzas. Although the smallest of the provinces of Cuba (area 31.74 square miles), it is the second largest in the point of population, which in 1919 was 697,583. It is also commercially the most important province of the Republic, having many large cigar and cigarette factories, sugar and saw mills, distilleries, tanneries, and foundries. Its surface is low and undulating. Besides valuable cabinet timber from its many forests it produces bananas, corn, pineapples, sugar cane, tobacco, vegetables, and yucca. The capital is Havana (*q. v.*).

HAVANA, a city and capital of the island of Cuba, on Havana Bay, on the N. coast. It is one of the most important commercial points in the Western hemisphere, and its harbor is one of the finest in the world, well sheltered, and entered through a deep and narrow channel, opening into a large basin, capable of sheltering 1,000 vessels. The harbor is provided with excellent covered wharves, and a dry dock. The city is divided into two sections, the older one of which has narrow, crooked streets, while the modern Havana has broad and beautiful avenues. The parks and promenades of Havana are among the most beautiful in the world; among them are the Plaza de Armas, in front of the governor's palace; the Alameda de Paula, along the bay; and the Parque de Isabel. Among the notable buildings are the Opera House; the Cathedral, built in 1724; the Government Buildings; and the celebrated fortresses, Morro Castle and Punta, at the mouth of the harbor; and La Cabana, a fortress S. E. of Morro. The city has a university, botanical gardens, scientific, educational and benevolent societies, gas and electric lights, and an excellent water supply, from the Chorrera. From 1761 till after the American occupation yellow fever was epidemic every summer, often very severe, but improved sanitary conditions, due to the rigid rule of the American military authorities, have stamped out the disease. The manufactures of the city include cigars and cigarettes, sugar, rum, straw hats, molasses, honey, and preserved fruits. It has railroad communications with Cabanos, Matanzas, Santiago, and other cities, and steamship lines to the United States, France, Spain, and Great Britain. Havana was for years the seat of Spanish power in Cuba. The city was formally evacuated by the Spanish on Jan. 1, 1899. Pop. (1918) 360,500. See CUBA.

HAVELOCK, SIR HENRY, an English general; born in 1795. In 1856 he commanded a division of the army which invaded Persia. In 1857, upon the breaking out of the Sepoy mutiny, he made a forced march from Allahabad to Cawnpur, but reached the latter city too late to prevent the massacre which occurred there. After defeating the rebels in three different engagements, he continued his march toward Lucknow, then beleaguered by a formidable force of mutineers. After victoriously fighting eight more battles with the enemy, he fought his way through the besieging army around Lucknow, and accomplished the relief of its exhausted garrison. For this service he received general rank, was created a baronet, and decorated with the cross of the Bath. He died in 1857.

HAVERFORD COLLEGE, an educational institution in Haverford, Pa.; founded in 1833, by the Society of Friends, under the name of Haverford School, and was made a college in 1856. It possesses a well-selected library, a chemical laboratory, philosophical apparatus, mineralogical and geological cabinets, an astronomical observatory and a gymnasium. It was the first collegiate institution founded and conducted entirely within the Society of Friends, and since 1849 others besides the sons of Friends have been admitted. In 1919 it reported: Professors and instructors, 25; students, 200; volumes in the library, 80,000; president, William Wistar Comfort, Ph. D.; Litt. D., L.L. D.

HAVERGAL, FRANCES RIDLEY, an English author; born in Astley, Worcestershire, Dec. 14, 1836. She began to write hymns and letters in verse at the age of 7, but did not publish anything till 1860. She was a frequent contributor to "Good Words." Among over 30 publications, which once enjoyed considerable popularity, may be noticed: "The Four Happy Days" (1873); "Under the Surface" (1874), poems; "Royal Graces and Loyal Gifts" (6 vols. 1879); "Under His Shadow" (1879); and a number of posthumous works by various editors. She died in Swansea, Wales, June 3, 1879.

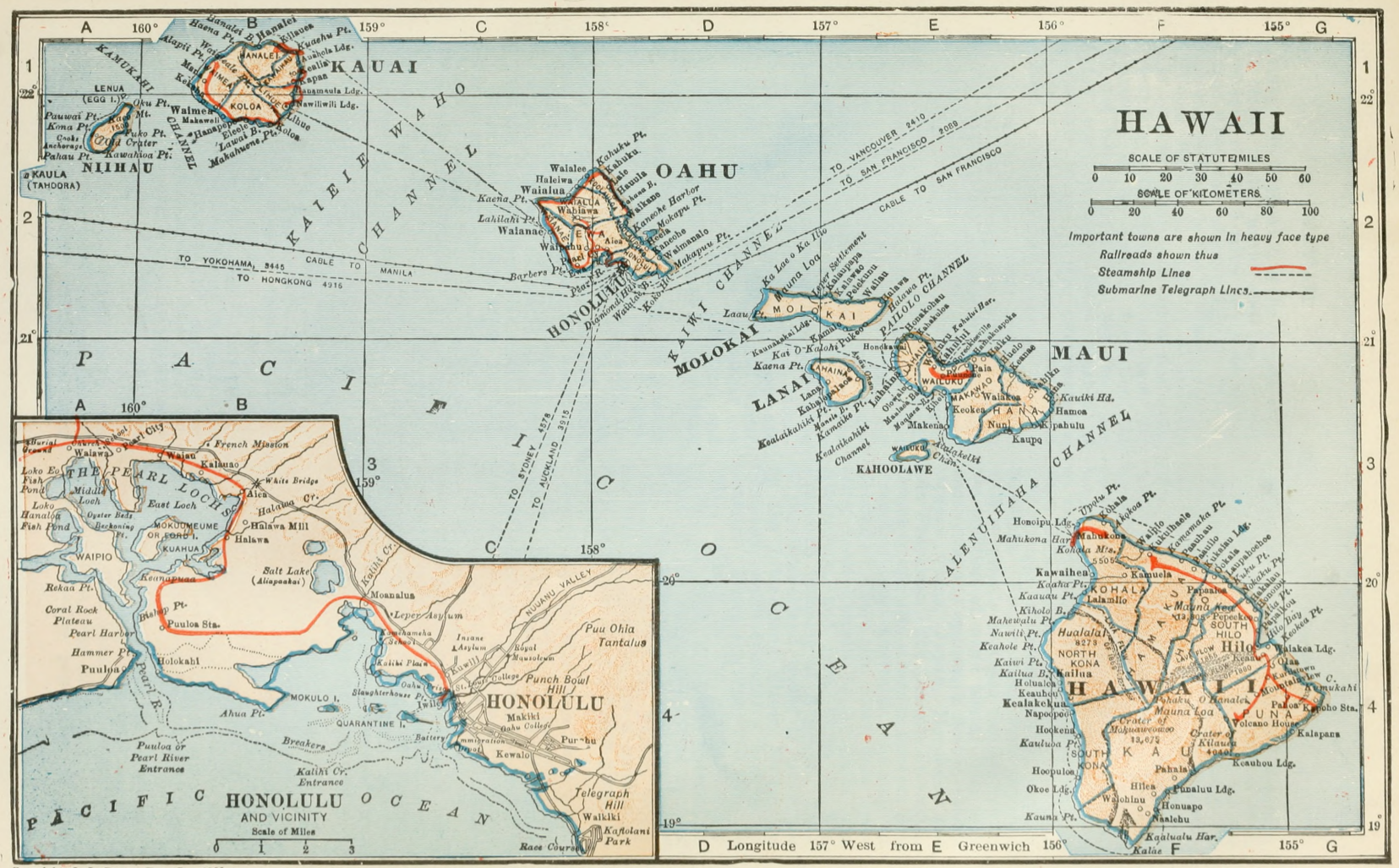
HAVERHILL, a city in Essex co., Mass.; on the Merrimac river, and on the Boston and Maine railroad; 33 miles N. of Boston. It is connected by bridges with the towns of Groveland and Bradford on the opposite side of the Merrimac, and has extensive manufactures of boots and shoes, hats, cotton and woolen goods, leather, lumber and brick. It is the trade center of a large farming district, and has gas and electric lights, electric street railways, waterworks, public high school, public library, daily and weekly newspapers, 4 National Banks and many notable public buildings. The city, originally the Indian village of Pentucket, was settled in 1640, incorporated as a town in 1645, and was chartered as a city in 1869. The birthplace of John Greenleaf Whittier. Pop. (1910) 44,115; (1920) 53,884.

HAVERSTRAW, formerly Warren, a city in Rockland co., N. Y.; on the Hudson river, and on the West Shore, the New Jersey and New York, and the New York, Ontario and Western railroads; 35 miles N. of New York City. It is the largest brick manufacturing city in the world. Other manufactures are brick-making machinery, dynamite, and baskets. The city has several parks, and points of interest, electric lights and street railways, daily and weekly newspapers, National bank. Pop. (1890) 5,070; (1900) 5,935; (1920) 5,226.

HAVRE, or **LA HAVRE** (ävr), formerly Havre de Grace, a fortified town, and the principal seaport on the W. coast of France. It is built on a low alluvial tract of land recovered from the sea, and is divided into unequal parts by its outward port and basins. The town has wide thoroughfares, and is clean and well-built, but presents few architectural features of interest. The port, which is the best and most accessible on the coast, consists of three basins separated from each other, and from the outer port, by locks. There are two roadsteads; the great, or outer, is about a league from the port, and the little, or inner roadstead, about half a league. Havre, being the seaport of Paris, most of the colonial and other products destined for its consumption are imported thither. The manufactures are chemicals, furniture, earthenware, oil, tobacco, rope, etc. Shipbuilding is also extensively engaged in. When the Germans invaded Belgium in 1914 Havre became the seat of the Belgian Government. Pop. about 136,000.

HAWAII, a territory of the United States of America, consisting of a group of islands in the middle of the Pacific Ocean; 2,000 miles from San Francisco; area, 6,449 square miles; capital Honolulu.

Topography.—The surface of the islands is exceedingly mountainous and of volcanic origin, with numerous active and quiescent volcanoes. The most prominent physical features of the group are the mountain peaks of Mauna Kea, and Mauna Loa, both 14,000 feet in height. Kilauea, on the Mauna Loa


HAWAII
SCALE OF STATUTE MILES
0 10 20 30 40 50 60
SCALE OF KILOMETERS
0 20 40 60 80 100
Important towns are shown in heavy face type
Railroads shown thus
Steamship Lines
Submarine Telegraph Lines
KAUAI
OAHU
MOLOKAI
LANAI
MAUI
KAHOOLAWE
NIIHAU
PACIFIC OCEAN
KAIEIE WAHO CHANNEL
KAIWI CHANNEL
PAILOLO CHANNEL
ALENUIHAHA CHANNEL
HONOLULU
Punch Bowl Hill
Telegraph Hill
Kapiolani Park
Race Course
Pearl Harbor
Puuloa or Pearl River Entrance
Kalihi Cr. Entrance
Breakers
Coral Rock Plateau
Hammer Pt.
Rekaa Pt.
Bishop Pt.
Puulua Sta.
Salt Lake (Aliapaakai)
Moanalua
Leper Asylum
Kamehameha Schools
Insane Asylum
Royal Mausoleum
Kalihi Cr.
Kalihi Place
Oahu College
Slaughterhouse Pt.
Pumping Station
Quarantine I.
Mokulo I.
Ahua Pt.
Makiki
Kewalo
Pukihu
Battery
Waikiki
Diamond Head
Koko Hd.
Koko Crater
Hanauma Bay
Waialua
Haleiwa
Waialee
Kaena Pt.
Lahilahi Pt.
Waianae
Waianae Mts.
Waianae Pt.
Makapuu Pt.
Barbers Pt.
Pearl Harbor
Ewa
Waipahu
Aiea
Halawa
Waimalu
Waiawa
Waiau
Kalauao
French Mission
White Bridge
Halawa Mill
Halawa Cr.
Aiea
Middle Loch
East Loch
Loko Hanalei Fish Pond
Loko Eo Fish Pond
Oyster Beds
Beckoning Pt.
MOKUOMEUME OR FORD I.
KUAHUA
WAIPIO
Puuloa
Navy Yard
Burial Ground
Naval Hospital
Pearl City
Honolulu
Waikiki
Kaimuki
Manoa
Nuuanu Valley
Punchbowl
Tantalus
Kaau Crater
Koko Crater
Koko Head
Hanauma Bay
Waialae
Kahala
Diamond Head
Kaimuki
Palolo
Manoa
Waikiki
Honolulu
Kalihi
Kapalama
Iwilei
Kewalo
Makiki
Punchbowl
Nuuanu
Pauoa
Pauoa Valley
Kalihi Cr.

mountain in Hawaii, is the largest active volcano in the world, and has an oval-shaped crater, 9 miles in circumference, and 6,000 feet above sea-level. On the island of Maui is the dormant crater of Mount Haleakala, from 25 to 30 miles in circumference, and 3,000 feet deep, standing 10,000 feet above sea-level. On account of its insular formation the coast line is extensive, but there are few good harbors, Pearl Harbor at Honolulu being the only important one. The rivers are few and unimportant, being mere mountain streams.

Climate, Soil and Productions.—Though the islands are entirely within the tropics the climate is mild, tempered by the N. E. trade winds, blowing nine months of the year. The rainfall in the mountain region is quite abundant, but on the coast slopes rain seldom falls. The soil is very fertile, being formed by the disintegration of the volcanic rocks and decay of vegetable matter. There is abundance of good pasturage, and cattle and sheep raising are important industries. The N. E. mountain slopes are covered with dense forests, and sugar cane, Indian corn, coffee, and wheat are cultivated on the plains. Tropical and semi-tropical fruits are grown on a large scale.

The two chief crops of the islands are sugar and pineapples, and the production of these has been greatly increased in recent years. The sugar yield in 1919 was about 600,000 tons, and the yield of pineapples, about 5,000,000 cases. The yield of sugar for the year 1920 was estimated at 568,671 tons, and that of pineapples, 6,000 cases. A large area has been made available for crops by irrigation. Extensive irrigation systems have been developed on the four main islands. A considerable area has been set aside as forest reserve. There were in 1920 about 74 of these reservations with a total area of 818,739 acres.

Commerce.—The imports for the fiscal year ending March 31, 1920, amounted to $63,283,647, compared with $50,743,899 for 1919. The exports amounted to $104,799,804, compared with $88,250,021 for 1919. The greater part of trade has been done with the United States. The imports to the United States in 1920 amounted to $53,669,174, and the exports to $101,194,733. The chief exports were sugar valued at $78,589,467; fruits and nuts, $18,509,028; and raw coffee, $521,316.

Communications. — Traffic with the mainland is conducted through lines of steamships operating direct passenger service in San Francisco and Honolulu. Five steamers were employed in 1920. This was augmented in 1921 by the addition of two additional steamers for service between New York and Honolulu, by way of the Panama Canal and San Francisco. The Pacific Mail Steamship Company operates three large steamers between San Francisco and Oriental ports, with stop-overs at Honolulu. Ten large freight steamers have also been put on this service. There is also a Manila-East India service with two passenger and freight steamers which stop at Honolulu. Preparations were made in 1920 to greatly increase this service by the addition of more boats. The Japanese company operates a fleet of vessels between China, Japan, Honolulu, and San Francisco. The Oceanic Steamship Company operates steamers between San Francisco and Australia, touching at Honolulu. There are other lines operating from Canada to Australia and Australasia, and from China to San Francisco, touching at Honolulu. Most of the inter-island traffic is conducted by the Inter-island Steam Navigation Company, which operates a fleet of 11 steamers. There are about 350 miles of steam railway in the islands. These carried in 1920, 2,054,568 passengers. Many of the large plantations operate their own railroads. In addition to the cable system across the Pacific, which has been in operation for a number of years, there are three wireless plants in operation.

Education.—In 1920 there were maintained on the islands, 173 public schools with 1,161 teachers and 38,295 pupils, and 59 private schools, with 384 teachers and 7,406 pupils. The number of pupils of all races in private and public schools was 45,701, compared with 43,271 in 1919. The University of Hawaii was established in 1920. This institution developed from the College of Hawaii. There were registered in 1920 242 students. There are in the territory two industrial schools, one for boys and one for girls.

Finance.—The total revenue collected by the Territory in 1920 amounted to $10,925,406, and the total expenditures aggregated $10,949,897. There was a balance on hand June 30, 1920, of $506,334. The assessment of personal and real property in 1920 aggregated $287,006,792. The total bonded debt in 1920 was $9,394,000.

Banking.—There were in 1920 two banks in operation. The total deposits amounted to $52,783,114, of which $15,807,778 were savings deposits.

Population.—The population of Ha-

waii, according to the census of 1914, was 255,912, compared with 191,909 in 1910. According to the 1921 census, the population was 255,912, divided as follows: American, British, German, and Russian, 25,000; Chinese, 22,600; Filipinos, 23,400; Hawaiian, 22,000; Japanese, 113,500; and Portuguese, 24,800. The remainder was made up of Coreans, mixed Hawaiians, Porto Ricans, Spanish, and others.

History.—The Hawaiian Islands were discovered by the Spaniards under Gaetano in 1549, and examined by Captain Cook in 1778, and during the greater part of the 19th century formed an independent kingdom, recognized as such by the United States, Great Britain, France, and other governments. In 1893 the reigning queen, Liliuokalani, was deposed and a provisional government formed. This provisional government resolved itself into a Republic in 1894, with two Houses and a President. Several attempts were made toward the annexation of Hawaii to the United States, and on July 7, 1898, the Congress of the United States passed a resolution to that effect. On Aug. 12, 1898, Hawaii was formally annexed to the United States. The islands, now known as the Territory of Hawaii, are governed by a governor appointed by the President. All whites, natives of Hawaii, and persons of African descent who were citizens of Hawaii before the annexation, are citizens of the United States. The president of the provisional and republican governments, and also the first governor after annexation was Sanford B. Dole.

On June 14, 1900, Hawaii was organized as a Territory. Mr. Sanford B. Dole was succeeded as Governor by George R. Carter. He served until 1907. In 1909 the United States Government decided to establish a large military station at Hawaii and work was begun on the fortifications and other necessary work. The organic act was amended in important details in 1910. Especially important changes were made in the land laws. Dredging of Pearl Harbor Channel, which had gone on for many years, was completed in 1912. The legislature of 1913 adopted measures of electoral reform.

Hawaii is the largest military outpost of the United States and was much affected by the declaration of war between the United States and Germany. The National Guard was brought to the maximum point of enlistment and efficiency and took over the policing of the islands. Eight German vessels and gunboats, which had been interned at Honolulu at the outbreak of the war, were seized by the United States Navy, following the declaration of war with Germany. On June 1, 1918, the first and second regiments of the National Guard were drafted into Federal service. The Territory suffered the greatest storm in its history during 1918. Much damage was done to property. A special session of the Legislature provided for the rebuilding of bridges and other public works. The great Pearl Harbor dry dock was opened in August, 1919. The Secretary of the Navy and others were present.

In 1920 the islands were unusually prosperous, due largely to the high price of sugar. A commission was appointed by the Legislature to ask Congress to amend the Territorial Organic Act in relation to the land laws. There were strikes during 1920 which lasted from Feb. 1 to June 30. These affected the large plantations. In April, 1920, there was celebrated the centennial of the landing in Hawaii of the first Christian missionaries. During the ceremonies the Prince of Wales was a guest for several days.

HAWARDEN (här'den), a small market-town of Flintshire, North Wales. There are some manufactures of tiles, pottery, etc. Lady Hamilton passed her girlhood here. Hawarden Castle, Gladstone's home, dates from 1752.

HAWK, the name of the several species of the genera *Accipiter* and *Astur*. The sparrow hawk is *Accipiter nisus*, the goshawk, *Astur palumbarius*. *Nauclerus furcatus* is sometimes called the swallow-tailed hawk; it is, however, a kite. Also the name of the sub-family *Accipitrinæ*, called more fully sparrow hawks. The bill is short, suddenly curved from the base, with a large festoon in the upper mandible. The wings are short. The male is often much smaller than the female. Hawks are generally distributed over the globe. Their prey consists of small birds and mammals. They build in trees.

HAWKESBURY, a river of New South Wales, Australia, rises in the Cullarin Range, and enters the Pacific at Broken Bay. It has a total length of 330 miles. The Hawkesbury is crossed by a steel girder bridge (1886-1889) on the railway between Sydney and Newcastle. It carries a double line of rails, and is one of the largest structures of its kind in the world, having seven spans of from 410 to 416 feet, and a total length between abutments of 2,900 feet.

HAWKINS, ANTHONY HOPE, an English novelist; writing under the name "Anthony Hope"; born in London, Feb,

9, 1863. He was admitted to the bar in 1887. Among his best-known works are: "A Man of Mark" (1800); "Father Stafford"; "The Prisoner of Zenda"; "The Indiscretion of the Duchess"; "Phroso"; "Heart of the Princess Osra"; "Rupert of Hentzau"; "The King's Mirror"; "The Great Miss Driver" (1908); "Young Man's Year" (1915); "Lucinda" (1920).

HAWKWOOD, SIR JOHN, in Italian, L'ACUTO or L'AGUTO, an English captain who won renown in Italy in the wars of the 14th century. He distinguished himself at the battles of Crécy and Poitiers. After peace was signed at Bretigny (1360) he gathered a band of mercenary soldiers and led them to Italy, where he at first took service with Pisa against Florence. Then, after fighting in most of the petty Italian wars of the period, notably for the Visconti and for Pope Gregory XI., he agreed to fight the battles of Florence in return for an annual pension. He died in 1394.

HAWTHORNE, HILDEGARDE, an American writer, born in New York, the daughter of Julian Hawthorne. She was educated privately and abroad. Her published writings include "A Country Interlude" (1904); "Poems" (1904); "Essays" (1907); "Old Seaport Towns of New England" (1916); "Rambles Through College Towns" (1917); and "Girls in Bookland" (1917). She was a frequent contributor to magazines and in 1918-1919 was engaged in war work in France for the Y. M. C. A. and the American Red Cross.

HAWTHORNE, JULIAN, an American novelist and journalist, son of Nathaniel; born in Boston, June 22, 1846. On leaving Harvard University he studied civil engineering in Dresden, but took to authorship: "Idolatry," "Fortune's Fool," "Sinfire," "Beatrix Randolph," "Archibald Malmaison," "A Fool of Nature," "Garth"; "A History of the United States" (1899-1912); "Hawthorne and His Circle" (1903); "The Subterranean Brotherhood" (1914).

HAWTHORNE, NATHANIEL, an American writer, born in Salem, Mass., July 4, 1804, from a long New England ancestry. When he was four years old, his father, a sea-captain, died in a distant land, and from that time his mother lived in complete seclusion. Thus home influences as well as an inborn disinclination for action made Hawthorne something of a recluse. The happiest time of his childhood was a period spent on Lake Sebago, in Maine, from which he was sent back to Salem to complete his preparation for college. At seventeen he entered Bowdoin, where he made only an average record, his main interests being not in his studies but in the reading in all fields of literature that he carried on by himself. For twelve years after he left college (1825-1837) he lived in the utmost seclusion, reading much and writing much, but destroying the greater part of his compositions. He saw little of his mother and sisters during this time, had no intimate friends, and published little. It was a period of self-training not unlike that of Milton at Horton. He sent a collection of seven tales to various publishers, who promptly returned them. Largely with his own funds he published "Fanshawe" in 1828, but afterward destroyed the greater part of the edition. "The Gentle Boy," and three other tales appeared in an annual in 1832, anonymously, and a few other tales appeared in the same way in succeeding years. Thus he prepared the way for "Twice-Told Tales," in 1838. Though its circulation was small, Hawthorne was encouraged by the favorable comments it called forth and came out of his hermit-like seclusion, got a position in the Boston Custom House, fell in love with Sophia Peabody, and in 1841 joined a communistic experiment at Brook Farm. In 1847 he married and went to live, for three years, in the Old Manse at Concord. Here he came to know Emerson, Alcott, Thoreau, and helped to make Concord a community of authors. A second series of "Twice-Told Tales," appeared in 1842; "Mosses from an Old Manse," in 1846, and "The Scarlet Letter" in 1850. Meantime, President Polk appointed him to the custom house at Salem, 1846. By 1851 he had moved again, this time to the Berkshires, where he wrote "The House of the Seven Gables," (1851), and two collections of tales for children, "The Wonder Book" and "Tanglewood Tales." President Pierce, who had been his classmate at Bowdoin, appointed him consul at Liverpool, and before his return to America he spent some time on the continent. In Italy he planned "The Marble Faun," which was written while he was still abroad and appeared in 1860. Various other romances were planned and partly written, but his health failed rapidly after his return to Concord in 1860, and he died May 19, 1864.

Besides his tales and romances, Hawthorne left voluminous note-books, written in America and abroad, which constitute a record of his reading and meditation. These afford valuable clues to his view of life, show the germs out of which his masterpieces grew, and illus-

trate the way in which he used simple incidents as symbols of truth. His material comes most often from legends and incidents of colonial New England. In the "Twice-Told Tales" we find simple descriptive sketches, which have little narrative but suggest types and symbols of experience, as yet without interpretation. We also find stories and legends of early colonial history, without significance except as simple narratives, but giving promise of the deeper study of Puritan character that was to follow. A third group is made up of tales, mainly legendary, which have symbolic or allegorical meaning, such as "The Minister's Black Veil," "The Wedding Knell," "The Lily's Quest." The pursuit of happiness is an illusion; there is a veil that separates one personality from another. In such a tale as "The Maypole of Merrymount," two racial ideals, the pagan tradition of old England and the Puritan tradition, are brought into collision, the more dramatic because the setting is the primeval forest of New England, with an untamed nature, the beasts of the forest, and the Indians as a background.

Hawthorne's work suggests the allegory of medieval and Elizabethan times. He uses symbols constantly as a means to perception of spiritual truth. The riddle of the soul's growth is his theme, in "The Minister's Black Veil" and in the series of the great romances, —in Dimmesdale, in Pyncheon, in the Faun. These symbols he worked out with exquisite skill. He described himself as a man sitting by the wayside of life and looking upon it as if under enchantment. Sitting thus, he observes the pilgrimage of the life of man and paints it for us with a careful realism that is also conscious of the spiritual truth which these realities reveal to the seeing eye.

HAY, the stems and leaves of grasses and other plants cut for fodder, dried in the sun, and stored usually in stacks. The time most suitable for mowing grass intended for hay is that in which the saccharine matter is most abundant in the plants, viz., when the grass is in full flower. For the operation of mowing, dry weather, and, if possible, that in which sunshine prevails, is chosen. Care must be taken to avoid haymaking either under a scorching sun or during the prevalence of rain, and the heaps should never be opened in the morning till the disappearance of the dew. On large farms the work is performed by haymaking machines in conjunction with other agricultural implements.

The total hay crop in the United States for 1920 was estimated at 108,233,000 tons, with a farm value of $1,809,162,000, and the total acreage at 72,830,000 acres. The greatest hay producing States were New York, Nebraska, Wisconsin, Ohio, Illinois, Minnesota, Missouri, South Dakota, Kansas, Pennsylvania, Iowa, and California.

HAY, JOHN, an American statesman and writer, born in Salem, Ind., Oct. 8, 1838. He was graduated from Brown University, and settled in Illinois as a lawyer, but went to Washington in 1861 as one of Lincoln's private secretaries, acting also as his aide-de-camp. He served under Generals Hunter and Gillmore with the rank of major and assistant adjutant-general. He was subsequently in the United States diplomatic service, stationed at Paris, Vienna, and Madrid. In 1897 he was made ambassador to England, and in 1898 Secretary of State. His literary reputation rests upon "Pike County Ballads," the best known of which are perhaps "Little Breeches" and "Jim Bludso"; "Castilian Days" and "Life of Abraham Lincoln" (with J. G. Nicolay). He died July 1, 1905.

HAYDN, JOSEPH, a German musical composer; born in Rohrau, on the borders of Hungary and Austria, in 1732. On account of the excellence of his voice he was appointed a choir-boy at St. Stephen's Church, Vienna. Having made the acquaintance of Metastasio, Porpora, and Gluck, Haydn gradually attracted public attention, was appointed organist to two churches, and obtained many pupils. From 1761 to 1790 he was musical director to Prince Esterhazy, and composed during this period some 120 symphonies for the orchestra, 12 operas, etc. In 1791 and 1794 he visited England, staying there nearly three years altogether, and writing his opera "Orpheus and Eurydice." In 1798 he published his oratorio of the "Creation," and in 1800 that of the "Seasons." His last public appearance was at a performance of his "Creation" in 1808. He may be said to be the originator of the symphony and of the stringed quartette. He died in 1809.

HAYDON, BENJAMIN ROBERT, an English historical painter; born in 1786. He produced many pictures of merit; among them the "Judgment of Solomon"; "Christ's Entry Into Jerusalem"; "The Raising of Lazarus"; "The Mock Election in the King's Bench"; "Napoleon at St. Helena"; "Alexander and Bucephalus"; "Alfred and the Trial by Jury"; "Uriel and Satan"; "The Burning of Rome"; etc. He died in 1846.

HAYES, PATRICK JOSEPH, an American prelate of the Roman Catholic Church, born at New York in 1867. He was educated at De la Salle Institute and Manhattan College, New York City; St. Joseph's Seminary, Troy, and the Catholic University of America. In 1892 he was ordained a Roman Catholic priest and did his first parish service under Mgr. Farley at St. Gabriel's in New York City. He served as secretary to Bishop, subsequently Archbishop and Cardinal, Farley. Appointed Chancellor of the Diocese of New York in 1903, he was further honored by being made first president of the Cathedral College in the same year. He became domestic Prelate to His Holiness, the Pope, in 1907, and was consecrated Auxiliary Bishop of New York in 1914; pastor of St. Stephen's 1915-1919; Bishop-Ordinary of the U. S. Army and Navy, 1917; member of the National War Council in same year, and Archbishop of New York in 1919.

HAYES, RUTHERFORD BIRCHARD, an American statesman; 19th President of the United States; born in Delaware, O., Oct. 4, 1822. His father died before his birth, leaving the family in comparative poverty. He was able, however, to be educated, first at the common schools, then in Latin and Greek with Judge Sherman Finch, of his native town, later in an academy at Norwalk, O., and in a school at Middletown, Conn. From here he entered Kenyon College at Gambier, O., and was graduated as valedictorian in 1843. He then took a course in Harvard Law School, and in 1845 was admitted to the Ohio bar. In 1852 he married Lucy, daughter of James Webb, of Chillicothe, O., a physician of repute. In 1858 he was elected city solicitor of Cincinnati. His affiliations were with the Whig party till the Republican party arose, after which he was steadily a Republican. On the outbreak of the war he received a commission as major of the 23d Ohio regiment of infantry, and was soon promoted to the rank of lieutenant-colonel. He distinguished himself at the battles of South Mountain, of Cloyd Mountain, the first battle of Winchester, at Berryville, Fisher's Hill, and Cedar Creek. After the latter engagement he was promoted to the rank of Brigadier-General. In 1864, while still serving in the field, he was elected to Congress from Ohio and re-elected in 1866. He supported the impeachment of Andrew Johnson.

In 1867 he was elected governor of Ohio and re-elected 1869, in which office his administration attracted national attention for its sound and progressive measures. In the greenback contest of 1875 he was nominated and elected as the sound-currency candidate for the governorship. This victory determined the Republicans of his State to present him as their candidate at the National Convention of 1876, where he was nominated for the presidency against J. G. Blaine, O. P. Morton, B. H. Bristow, and other popular candidates. The election came into dispute, both parties claiming the electoral votes of Louisiana, Florida, Oregon, and South Carolina. The contest was left to a special commission of 15, who decided by a vote of 8 to 7 that all of the votes in question should be counted for Hayes, and for his colleague for Vice-President, Wheeler, thus giving him the presidency. The popular plurality, however, was against him. His administration was characterized by the resumption of specie payment, the inauguration of civil-service reforms, the restriction of Chinese immigration, and reconstruction measures for the South. The satisfaction of the country in general with his administration was mingled with much criticism, especially as to his attitude relative to the employment of military force at elections, and for his appointment to office of members of the Louisiana returning boards. On his retirement he served on the boards of various benevolent societies and educational institutions, and was honored with degrees from Kenyon College, Harvard, Yale, and Johns Hopkins. He died in Fremont, O., Jan. 17, 1893.

HAYES RIVER, or **HILL RIVER**, a river of British North America, rising near Lake Winnipeg, and flowing N. E. through lakes Holy, Knee, and Swampy, enters James Bay at York. Length, about 300 miles.

HAYS, WILL H., an American public official; born in Sullivan, Ind., in 1879. He graduated from Wabash College in 1900, and in the same year was admitted to the bar. From 1910 to 1913 he was city attorney of Sullivan, Ind. He entered politics early in life and from 1904 to 1908 was a member of the Republican State Advisory Committee from Indiana. In the campaigns of 1906 and 1908 he was chairman of the Speakers' Bureau of the Republican State Committee. He served in other capacities in the State Committee, from 1910 to 1914. In 1917-1918 he was chairman of the Indiana State Council of Defense. He was appointed chairman of the Republican National Committee in February, 1918. In this capacity he did much toward uniting the Progressive and regular elements of the Republican party, and thus brought about a unified party in the campaign of 1920. He was

a warm friend of President Roosevelt, and also of President Harding, who appointed him Postmaster-General in his cabinet.

HAZELTON, a city in Luzerne co., Pa., on the Pennsylvania, the Wilkes-Barre and Hazelton, and the Lehigh Valley railroads; 115 miles N. W. of Philadelphia. It is the center of the Lehigh anthracite coal region, with 40 mines in the vicinity. Besides its coal mining and shipping interests, the city has railroad shops, iron works, and extensive manufactures of flax, brooms, silk, macaroni, chewing gum, and coffins. It is the seat of the Miners' State hospital; has electric lights and street railways, public high school, Hazelton Seminary, daily and weekly newspapers, and 2 National banks. Pop. (1910) 25,452; (1920) 32,267.

HAZLITT, WILLIAM, an English author and critic; born in 1778. Educated for the clerical profession, Hazlitt, after a brief attempt at an art career, decided to enter literature, and in 1805 produced his "Principles of Human Action." This was the germ of a long and successful literary career, during which he gave to the world his "Lectures on the Literature of the Elizabethan Age"; "Table Talk"; "Lectures on the English Poets"; "The Spirit of the Age," and "Life of Napoleon Bonaparte." He died in 1830.

HEAD, in anatomy, the skull, or cranium. Part of the head consists of an osseous ovoidal capsule for the protection of the brain. The face proper consists of the upper and lower jaws. The skull in old age becomes composite like the sacrum in the adult. The margins, or sutures, of the cranial bones, 22 in number excluding the hyoid bone, correspond to the articular processes in the trunk. In youth the flat cranial bones are connected by a double lamina of cartilage; notwithstanding the junction of the margins, they grow by the increase of one cartilage and the ossification of the other. Like the arch in the movable vertebræ, we have the arch in the head; in the lower part there are bones physiologically connected with the head bones of the neck. There are three segments in the head: (a) The posterior, beginning from the cervical vertebræ below the occipital segment, consisting of a single bone, in reality four bones; a part of it lies in the base of the cranium at the back of the face, but the greater part extends up the back of the cranium. It consists of a ring, lateral sides, and an arch. (b) The anterior, consisting of the frontal and ethmoid bones. The only vestige here of the vertebral foramen is the foramen cæcum. (c) The central segment; in the middle line below, and cut in two halves by the mœsial plane, is the sphenoid bone, but along with it are two bones, the temporal, attached to its outer portions or great wings, composing the basis of the arch completed by the two parietal bones. These segments are divided by the lambdoidal sutures and coronal. The head is divided into a base and a vault, or calvarium; the inner aspect is called the cerebral, the other the superficial, external, etc., aspect. The bone on the outside of the cranium is not so dense as it is on the inside, in accordance with a law of construction in all animal and vegetable bodies, a law of part, and a law of place. Some anatomists count four segments, the two temporal bones constituting the fourth. The vertebrata have a head homologous in its anatomy with that of man. That of the *Annulosa* is homologous in functions, but not in parts. The cephalopodous and gasteropodous mollusks have heads, the *Conchifera*, sometimes called *Acephala*, want them. Most animals of lower organization than these are destitute of heads.

HEALTH ASSOCIATION, AMERICAN PUBLIC, an association of public officials and other individuals interested in the promotion of sanitary science in its relation to municipal government. The organization had its origin in 1872, when, on April 18, an informal conference was held in New York City, at which were represented five States and five cities. A committee was appointed to draw up a constitution for a national institute of sanitary science. In the following September the constitution was formally adopted and officers were elected. The association has since published a great deal of literature on public sanitation and has devoted much energy to education along these lines. Its official organ is "The American Journal of Public Health."

HEALTH INSURANCE, a form of insurance which insures its beneficiaries against need in time of illness and compensates for the loss of employment during periods of illness. It is one of those departments of the general field of insurance which was taken up reluctantly by private enterprise, on account of the difficulty of protecting the insurance companies against fraud. Health insurance may be divided now into three distinct classes; commercial, mutual, and social. Commercial health insurance has developed only to a limited extent, and that only within the past few years, being generally connected with the business of casualty companies. Mutual

health insurance, commonly known as "sick and death benefit," has acquired vast dimensions in all civilized countries. It had its origin in the early "friendly societies" of Great Britain and the fraternal orders of this country. Mutual health insurance is based on distinctly co-operative principles. These co-operative enterprises in their turn, obviously, had evolved from the still earlier forms of mutual benefit associations, the guilds, which assured their members support during illness. Some historians find traces of such organizations having existed in Anglo-Saxon England. After the institution of the factory system of employment in England and this country, with its precariousness of livelihood, the mutual societies sprang up spontaneously all over both these countries among the working classes. As modern industrialism appeared in other countries, and in the order of its appearance, these also developed similar working-class organizations.

The objects that these societies first contemplated were the securing, in return for small weekly payments by the members, of a weekly sum during sickness and a pension after a certain age. At first these weekly payments by the members were uniform in amount, but with the accumulated experiences which followed, the system of collecting higher payments in proportion to the ages of the members began to be adopted, it being recognized that liability to sickness increased with age. On account of the disinclination of private enterprise to enter the field of health insurance, the British Government very soon began to interest itself in the welfare of the friendly societies, and assisted them in formulating scales of payments, based on statistics gathered by the Government itself, a task which was at that time beyond the capacity of any working-class organization. This government protection became all the more necessary because of the many fraudulent societies which, initiated by private individuals, preyed on the ignorance of the working people. Eventually the Government, through the Registrar of Friendly Societies, made itself responsible for the reliability of all genuine mutual aid societies, based on the principles which the Government itself had formulated.

Social health insurance is of much more recent origin than the mutual aid class of insurance, and generally implies state backing. On a broad scale, this form of health insurance had its origin in Germany, where it was instituted in 1884, largely through the sponsorship of Bismarck, who saw in this type of government paternalism an antidote to the growth of revolutionary Socialism. The idea was then adopted in other countries, in the following order: Austria, 1888; Hungary, 1891; Luxemburg, 1901; Norway, 1909; Serbia, 1910; Great Britain, 1911; Russia, 1912; Rumania, 1912, and the Netherlands, 1913. In the above countries the system is compulsory, within the limits of certain industries, and on employees whose yearly incomes fall below a certain set minimum. In all these cases the government assumes only a part of the cost, amounting to various percentages in the different countries. Great Britain assumes two-ninths of the cost, but adds various other supplementary subsidies, which bring it up to one-third. The beneficiaries are obliged to pay: men ten shillings a year, women eight shillings. Other countries base their subsidies on the wages of the policy holders, ranging from a third to one-half. In all the employers are also compelled to contribute, ranging from a third in Germany to a half in Hungary. The average period of the benefit is for twenty-six weeks.

In this country there has also been a rapid extension of social insurance as an idea, since 1911, in connection with the workmen's compensation movement in the various States. In 1915 the American Association for Labor Legislation drafted a tentative bill for State insurance, which was brought up in the following year in the legislatures of Massachusetts, New Jersey and New York. In each case the bill failed being passed, but the result was to create wide public discussion in the press. The idea is now being pressed strongly by such organizations as the American Medical Association, the American Public Health Association, the National Conference of Charities and Correction, and by many labor organizations, notably by the State federations of labor.

HEARN, LAFCADIO, an American journalist; born of an English father and a Greek mother, in Santa Maura, Ionian Islands, June 27, 1850. He was educated in England and France, and resided in the United States and in Japan. He wrote "Some Chinese Ghosts" (1887); "Two Years in the French West Indies" (1890); "Youma" (1890); "Glimpses of Unfamiliar Japan," and several other books on Japan, including "Kokoro: Hints and Echoes of Japanese Inner Life"; "Gleanings in Buddha Fields" (1897); "In Ghostly Japan" (1899); "Shadowings" (1900); etc. He died at Tokio, Sept. 27, 1904.

HEARST, WILLIAM RANDOLPH, an American newspaper owner and politician, born in San Francisco, Cal., 1863,

son of George Hearst, former United States Senator. He graduated from Harvard in 1885, and taking up his father's interests in San Francisco, began to develop the "San Francisco Examiner." Gradually he established newspapers in other American cities, until he became one of the most powerful newspaper owners in the country. He was the owner of the "Los Angeles Examiner," the "Chicago Examiner," the "Chicago American," the "Atlanta Georgian," the "Boston American," the "Boston Advertiser," the "New York Evening Journal," the "New York American" and a number of daily papers in smaller communities. All are notable for their sensational treatment of the daily news. Mr. Hearst was also the owner of the "Cosmopolitan Magazine," "Hearst's Magazine," "Good Housekeeping," "Harpers Bazar," the "Motor Magazine" and the "Motor Boating Magazine." He was elected to the 58th and 59th United States Congresses (1903-1907), from the Eleventh New York Congressional District. In 1905 he was the candidate of the Independence League for Mayor of New York, and candidate for Governor of New York in 1906, but was in both cases defeated.

HEART, in human anatomy, the central organ of circulation, inclosed in a membrane, the pericardium, and lying between the two layers of pleura, the mediastinum, with the base directed upward and backward to the right shoulder, and the apex downward and forward between the fifth and sixth ribs, and to the left. The under side is flattened and rests on the diaphragm, the upper rounded and convex, formed by the right ventricle and partially by the left; above these are the auricles whose appendages project forward, overlapping the root of the pulmonary artery, the large anterior vessel at the root of the heart, crossing obliquely the commencement of the aorta. The right is the venous side of the heart, the left arterial. The right auricle is larger than the left, and more complex in structure; it has two valves, the eustachian and the coronary. There is not the same pyramidal form in the left ventricle as in the right; the apex of the heart is also the apex of the left ventricle, and therefore larger than the right. The valves of the right ventricle are the tricuspid and semilunar; of the left the mitral (bicuspid) and semilunar. The auriculoventricular opening connects the auricles and ventricles, and in connection with the ventricular valves we have the *columnæ corneæ*, of which there are three sets, and the *chordæ tendineæ*. There are three layers of fibers in the ventricles—the external, middle, and internal—their peculiar spiral arrangement causing the tilting forward of the cardiac apex. The fibers of the auricles are in two layers —the external and internal; and the left auricle is thicker and more fleshly than the right. From the right ventricle arises the pulmonary artery, conveying the venous blood to be aërated in the lungs; the infundibulum is a prolongation of the anterior wall. The left auricle contains the four pulmonary veins returning the blood to the heart, thence to the left ventricle, and thence to the aorta, to be distributed to every part of the body, returning by the superior and inferior *vena cava* to the right auricle.

In the lowest animals we have no blood-vessels, every part absorbing nutritious fluid for itself; the lower Entozoa, and even the embryo in man in its early stage, are examples. Among the higher reptiles, we find the circulation approaching that in birds and mammals, till we get the double heart, as in man.

HEAT, in natural philosophy, the term used chiefly to mean, not the sensation which our bodies feel when we say that they are hot, but the particular state or condition of matter which causes this sensation. The accepted hypothesis is that heat is caused by an oscillatory or vibratory motion of the particles of a body. It is thus a condition of matter and not a substance. The hottest bodies are those in which the vibrations move quickest through the widest space. It is called also the Mechanical or Dynamical Theory of Heat.

Heat makes bodies, whether solid, liquid, or gaseous, expand, while cold contracts them. Water is a partial exception to the rule. In the case of a solid, heat can produce fusion at a certain definite temperature; in that of liquids vaporization. It is transmitted by radiation or by conduction. Radiant heat is that produced by radiation. Latent heat is that which is absorbed by solid bodies when they are subjected to calorific influence far more than sufficient to make them melt, and when at the very time they are in process of fusion. The heat does not raise the temperature of the solid until it is completely liquefied. There is also a latent heat of vaporization, being heat absorbed by liquids when being converted into vapor. Latent is opposed to sensible heat. Heat may be reflected or refracted, or, by being ir-

regularly reflected in all directions, it may become scattered or diffused heat; reflection and refraction may also polarize its rays, as happens to those of solar light. The heat which falls on a body is called incident heat. Specific heat is the quantity of heat required to raise the temperature of a body of a given weight 1°; the unit of measure being the quantity required to raise the same weight of water to the same temperature. Heat may be produced by solar radiation, chemical action, friction, pressure, percussion, absorption, and imbibition; by the conduction of powerful magnets and bodies in motion, etc.

HEATING and VENTILATION. In cold climates, artificial heating and ventilation are both necessary for health and comfort and are equally important. Because the discomfort produced by low temperature is more acutely and immediately felt than that due to foul air, improper ventilation is more common than deficient heating. The two subjects are so closely related, however, that they will be considered together in this article, the question of heating being first dealt with in greater detail.

The temperature most conducive to bodily comfort cannot be stated definitely as it is largely determined by climate and personal habit, varying in different countries. A temperature of 68-70° F. is considered necessary in the U. S. A. and Canada, but 62° F. is the temperature most favored in England. All systems of heating depend upon radiation or convection; or, more generally, upon a combination of the two. The commonest example of radiation is the open fireplace which radiates heat, and so warms the walls and furniture of the room, while leaving the air comparatively cool. An example of convection is found in the hot air furnace, which supplies currents of warm air, which constantly replace the cold air. Radiation and convection combined are found in the ordinary steam or hot water radiator, which heats the air by convection and also radiates some heat to surrounding objects. Heat is most commonly produced by the combustion of coal, wood, coke, oil, gas, or some other fuel, but is occasionally obtained electrically, the electricity being produced by water-power.

Comparing the relative merits of the different forms of heating the open fireplace is popular because it is cheerful to see, and from the hygienic point of view it is good because it produces a simple but efficient means of ventilation. It utilizes, however, only 10-15 per cent. of the heating value of the fuel, and, unless supplemented by other forms of heating, is quite inadequate for providing sufficient heat in cold climates. The stove which stands out in the room, being connected to the chimney by a pipe, is upward of 50 per cent. efficient, but it has the disadvantage of being dusty, and of quickly producing foul dry air unless careful attention is given to ventilation. The hot-air furnace is of two types. The older type conveys the heated air from a central chamber to various parts of the house by means of pipes; the more modern type is pipeless, the heat entering the upper part of the house from a single register on the first floor, and being carried by convection to all parts of the house. The furnace is supplied with fresh air from the outside, and provided this feature is properly cared for, a hot air system is probably the most healthful method of heating a dwelling. With the old type of furnace, however, it is difficult to obtain uniform heating, the rooms on the windward side of the house being cold, while those on the sheltered side are overheated. The pipeless furnace is growing in popularity, and gives satisfaction in houses of suitable size and design. The steam furnace generates steam from a boiler in the cellar and distributes it over the house by means of pipes connected to radiators. The hot-water furnace is similar, except that hot water instead of steam circulates through the pipes and radiators. Both systems have advantages and disadvantages. Hot water is more difficult and expensive to install but has the advantage that it begins to supply warmth as soon as the water becomes heated, whereas, with steam, the water must boil before heat is supplied. Hot water is also quieter than steam, but high temperatures can be produced more rapidly with the latter and much less radiating surface is needed. A modern development of steam heat is the so-called "vacuum system," in which the whole system of piping and radiators is maintained under a slight vacuum. One advantage of this system is that the knocking and hissing of the radiators is avoided. Another recent modification is the gas-steam radiator, which is a radiator having a small reservoir of water at the base, heated by gas burners. As the pressure, due to generation of steam, rises, the gas is automatically lowered. Electric heating is too expensive for use on a large scale, but finds application in small heaters for intermittent use, and also in the heating of street cars.

Ventilation.—A steady supply of fresh

air is necessary to the well-being of the animal body, because one-fifth of the air consists of oxygen and it is upon oxygen that the heat and energy of the body depends. When fuel burns, carbonic acid gas is produced. The same gas is contained in the breath from the body, and to produce this carbonic acid, oxygen is absorbed from the surrounding air. An excess of carbonic acid in the air produces headache, depression and even nausea, and anything in excess of six parts per ten thousand is liable to cause discomfort. A gas burner, in a small room, will very quickly pollute the air, and for every cubic foot of gas consumed, eight cubic feet of air are exhausted of their oxygen. It is estimated that one person requires 3,000 cubic feet of air per hour. That is to say, a room 30 feet long, 10 feet high and 10 feet wide contains sufficient air to supply one person for one hour, but it is clear that no one could live in a hermetically sealed room of such a size for that length of time without suffering from poisoning, because throughout the time he would be polluting the air and the pollution would pass the safe limit very soon. In the ordinary room, of course, there is constant leakage of bad air and admittance of pure air through cracks and in the doors and windows, through the chimney and by other accidental means. In actual practice, it is found that 250-300 cubic feet per person in dwellings and factories is sufficient.

HEAVEN, in theology, the place or state of the blessed.

HEBREW, the character in which the Hebrew language is now written. This, called the square character, was not the earliest. The general opinion is that it came into use only in the centuries immediately preceding the birth of Christ, or even about the commencement of the Christian era itself. The character on the Maccabee coins is like the Samaritan, rather than the square Hebrew one.

HEBREWS, EPISTLE TO THE, one of the most important epistles of the New Testament. Clement of Rome referred to it about A. D. 96, as did Justin Martyr in the 2d century, followed in due time by many other Christian fathers. The Greek fathers generally attributed the epistle to St. Paul; the Latin Churches in Europe and northern Africa were long of a different opinion, but by the commencement of the 4th century the Eastern view largely prevailed, in the West as well as in the East, and by the commencement of the 5th century it was everywhere dominant. Jerome and Augustine had much influence in giving it currency, which it retained to the Reformation. Erasmus, Cardinal Cajetan, Luther, Calvin, Beza, and others revived the old doubts. The Council of Trent gave a decision in favor of St. Paul, but in Protestant countries the question is still held to be a debatable one.

HEBRIDES (heb'ri-dēz), a large group of islands, 500 in number, situated of the W. coast of Scotland, of which 100 are inhabited. They comprise, in all, an area of about 3,000 square miles. Among the larger and more notable of these are Skye, Eigg, Mull, Iona, Staffa, Ulva, Lismore, Islay, and Rum, the largest being Skye, of the inner Hebrides, that lie nearer the coast; and Lewis, Harris, Northern and Southern Uist, Barra and Benbecula, of the outer Hebrides, lying farther W., and separated by the strait and channel of Minch and Little Minch from the inner group, the largest being Lewis and Harris, really forming but one island but belonging to two counties. These islands are for the most part rocky and infertile, but well adapted to grazing purposes, the chief industry being the pasturing and rearing of live stock. The islands have been developed and improved by the building of good roads, and the establishment of frequent communication with Glasgow by steamship. The moors and fens abound in winged game, hare, etc., and are visited by sportsmen in great numbers, being largely and profitably rented for sporting purposes. The islands are a resort for summer tourists on account of their picturesque scenery. The fishing industry is considerable. Pop. about 100,000.

HEBRIDES, NEW, a group of islands in the South Pacific, discovered by Quiros, in 1506. Captain Cook, who surveyed most of them in 1773, gave them their name, as being the most W. of the islands of the Pacific. They extend over 375 miles. Area, 4,200 square miles. The soil in the valleys is fertile, but the islands are mostly mountainous, and some have active volcanoes. Since 1887 the group is under a mixed French and English commission. Pop. about 75,000.

HEBRON (hē'bron), one of the oldest cities in Palestine, belonging to the tribe of Judah, 21 miles from Jerusalem. It was anciently called Kirjatharba, and at a later period was the seven years' residence of King David before he conquered Jerusalem. The modern town, El Khalîl ("the friend"—of God, Abraham). Pop. (1919) 22,000. It lies low down in a narrow and picturesque valley—the

Valley of Eshcol, famous now, as of old, for its thick clustering grapes, its olives, and other fruits. The church erected by the Empress Helena, the mother of Constantine, on the spot where Abraham is said to have been buried, has been converted into a mosque called *El-Haram* ("sanctuary"), built to inclose the cave which is the traditional burial-place of Abraham, Isaac, and Jacob and their wives.

HECLA or **HEKLA**, a volcano of Iceland, about 20 miles from its S. W. coast, about 5,000 feet in height, and having several craters. It is composed chiefly of basalt and lava and is always covered with snow. Many eruptions are on record. One of the most tremendous occurred in 1783, after which the volcano remained quiescent till September, 1845, when it again became active, and continued with little intermission till November, 1846, to discharge ashes, some masses of pumice stone, and a torrent of lava.

HECTOR, the son of Priam and Hecuba, the bravest of the Trojans, whose forces he commanded. His wife was Andromache. His exploits are celebrated in the "Iliad." Having slain Patroclus, the friend of Achilles, the latter sought revenge, and Hector was slain by him. The body of Hector was dragged at the chariot wheels of the conqueror; but afterward it was delivered to Priam for a ransom, who gave it a solemn burial.

HEDIN, SVEN ANDERS, a Swedish explorer and geographer, born in Stockholm, 1865, educated in Upsala, Berlin, and Halle. In 1885 he made his first trip to Persia and Mesopotamia. In 1890 he went to Persia as a member of the Swedish King's embassy to the Shah. In the following year he explored Khorrasan and Turkestan. In 1893 he began the four years' expedition which made him world-famous; a trip from Russia to Pekin, by way of Tibet. Subsequently he made two other exploring trips to Tibet. Among his many achievements are the discovery of the source of the Brahmaputra, the Indus and Lake Chunitzo. Hedin lost somewhat of his prestige by his fanatical championship of the German cause during the World War. Among his works are: "A Journey Through Persia and Mesopotamia" (1887); "The Scientific Results of a Journey Through Central Asia" (6 vols., 1893-1904).

HEDJAZ or **HEJAZ**, a kingdom of Arabia, situated on the N. E. coast of the Red Sea, extending from the Gulf of Akabah to about the parallel of 20° N. and to the Nafud Desert on the E. The area is about 96,500 miles, and consists largely of sand with little vegetation. The land slopes to the N. with the Tehema Mountains in the center rising to a height of 6,000 feet. Bedouins compose the population which is estimated at about 300,000. The chief centers of population are the sacred cities of Mecca and Medina, and Jeddah which is the principal port. A railway line, to be known as the Medina-Mecca-Jeddah line, was in the course of construction by the Hejaz Railway Company when the war broke out. The region was under nominal Turkish sovereignty, but in 1917 the Arabs, with the aid of the British, revolted against Turkish rule. The immediate occasion of the rising was the strengthening of the Turkish garrison at Medina by 3,000 picked troops, which the Sheerif of Mecca opposed. By inherited right, acknowledged by the Turks for more than two hundred years, he exercised an authority in the Hedjaz both political and religious. But it was feared that Arabia was to be brought under complete Turkish sovereignty In June, 1917, the discontent among the Arabs and Bedouins come to a head. The Turks held Mecca by means of forts and fortified barracks. These were besieged by the Sheerif and his troops. The garrison opened fire upon the city with their guns and even the Great Mosque was damaged. After being beleaguered for a month the Turks in Mecca capitulated. Then the revolt spread to the coast. At Taif the Arabs besieged and took prisoners Ghabil Pasha, the Governor-General of the Hedjaz, and 3,000 Turkish regulars. Next, with British aid in the form of arms and munitions, they cut off Medina. It was not possible to storm the city, which was held by some 14,000 men and was strongly fortified. But it was blockaded, and the blockade kept up until the end of the war. In the meantime Arab forces moved N. against Maan. The Turks sent the re-enforcements from Constantinople and Damascus. The hostile movements of the Bedouins proved of value to the British as a means of withdrawing Turkish forces from the front in Palestine and in Mesopotamia, and every effort was made through British diplomacy to add to the unrest among them. The rising in the Hedjaz almost synchronized with the British entry into Palestine, and the two events caused much alarm among the Turkish leaders. Against General Allenby in Syria on the coast sector was the 8th Turkish army, Von Kraasenstein in

command; N. of Jerusalem the 7th Turkish army, under Fevri Pasha; and E. of Jordan, based upon Ammam, the 4th Turkish army. It was the last army which was concerned in resisting the advance N. of the Arabs of the Hedjaz, and its difficulties were great. The Arabs were not slow to perceive the difficulty of the Turkish position and they continued their operations, winning minor successes as the Turkish difficulties increased, and receiving from the British all the aid that could be given them. Before the Turkish collapse the Hedjaz had been cleared largely of Turkish troops and the Arabs had been installed in the garrisons at Mecca and Medina. Following the downfall of the Turks the independence of the Hedjaz was proclaimed by the Arabs and was guaranteed by the Treaty with Turkey. The Emir Hussein assumed the title of king in Nov., 1916.

HEGEL (hā'gl), **GEORG WILHELM FRIEDRICH**, a German metaphysician; born in Stuttgart, in 1770. He studied at the theological institute of Tübingen from 1788-1793, and was next a private tutor at Berne (1793-1796), and subsequently at Frankfort-on-the-Main (1797-1800). Having removed to Jena, and contracted an intimacy with Schelling, he devoted himself to metaphysical study. After the battle of Jena, Hegel was employed on a newspaper at Bamberg till 1808.

He was professor successively at Jena, Heidelberg, and Berlin. He was at first the disciple of Schelling, with whom he was associated in the conduct of a philosophical journal in 1802-1803. But his opinions gradually took a different turn. He rejected Schelling's intellectual intuition as an unwarrantable assumption, though he continued to maintain its leading idea—the unity of the subjective or ideal, and the objective or real; and in this idea endeavored to establish that absolute cognition and absolute truth, which alone, according to this school, can satisfy the demands of the philosophical spirit. Hegel seems not to have perfected his system; and as he had no power of exposition, or of lucid expression of his thoughts, it is impossible to give a clear view of his philosophy. His most important works are his "Phenomenology of the Mind"; "Logic"; and "Encyclopædia of Philosophical Sciences." He died in Berlin, in 1831.

HEIDELBERG (hī'dl-berG), a town of Baden; on the left bank of the Neckar, here crossed by two bridges; in one of the loveliest districts of Germany. It is on a narrow strip between the river and the castlerock and Geisberg, spurs of the Königstuhl (1,850 feet); and chiefly consists of one main street and less important cross and paralled streets. The principal buildings are: The church of St. Peter; the church of the Holy Ghost; the castle, anciently the residence of the Electors Palatine; HEILDELBERG UNIVERSITY (*q. v.*); the town house, etc. The castle, begun in the end of the 13th century, and exhibiting elaborate examples of early and late Renaissance architecture, is the most remarkable edifice in Heidelberg. It is now an ivy-clad ruin, but is carefully preserved from further decay. The principal industry is brewing. One of the greatest curiosities of the place is the Heidelberg tun, kept in a cellar under the castle. It is 36 feet in length, 26 in diameter, and capable of holding 800 hogsheads. Heidelberg is rich in public walks and fine views, that from the Königstuhl being of surpassing beauty. It was long the capital of the Palatinate, but was superseded by Mannheim in 1720. In 1622 Tilly captured and sacked the city. A similar fate overtook it in 1689 and 1693 at the hands of the French. Pop. about 56,000.

HEIDELBERG UNIVERSITY, a coeducational institution in Tiffin, O.; founded in 1850 under the auspices of the Reformed Church in the United States; reported at the close of 1919: Professors and instructors, 25; students, 331; president, C. E. Miller, D. D.

HEIDELBERG UNIVERSITY, a renowned institution in Heidelberg, Germany. It was founded by the Elector Rupert I. in 1386, and continued to flourish till the period of the Thirty Years' War, when it began to decline. In 1802, however, when the town with the surrounding territory was assigned to the Grand-duke of Baden, a new era commenced for the university, and it rapidly became famous. It comprises faculties of theology, law, medicine, and philosophy. In 1914 there were 196 professors and instructors, over 2,300 students, and 500,000 volumes and 4,700 MSS. in its library. Many of the most famous German scholars have been professors here—Reuchlin, Œcolampadius, Spanheim, Puffendorf, Gervinus, Paulus, Kuno Fischer, Helmholtz, Bunsen, Blüntschli, etc.

HEIFETZ, JASCHA, a Russian violinist, born at Vilna, Russia, in 1901. He began studying the violin at the age of 3, and at 5 years of age entered the Royal School of Music at Vilna. He continued to study at St. Petersburg and made his first public appearance at the

age of 5. At 9 years of age he gave a recital in St. Petersburg and was engaged for solo work with the Symphony Orchestra. He later appeared in the leading cities of Germany, Austria, and Russia. He made his first appearance in New York on October 27, 1917. He at once gained recognition as a master of the violin. He made frequent tours throughout the United States in the years following.

HEILBRONN, a town of Württemberg, situated on the right bank of the Neckar. The streets of the old medieval town are narrow, and the houses have quaintly ornamented gable-ends and tapering pinnacles. The church of St. Kilian, partly Gothic and partly Renaissance; the old town hall; the Diebsthurm ("Thief's Tower"), in which Götz von Berlichingen was confined; and the house of the Teutonic Knights, now a barrack, are the principal buildings. The chief industries include the manufacture of silver plate, paper, sugar, salt, chicory, and chemicals, and there are iron and other metal foundries and machine shops. Fruit and wine are largely grown. Commercially the importance of Heilbronn depends on its trade in groceries, corn, and wood, and on its fairs for cattle, leather, wool, and fruit. In the vicinity gypsum and sandstone are quarried. Heilbronn is first mentioned in 741; in 1360 it became an imperial town; it suffered during the Peasants' War and the Thirty Years' War, and in 1802 it fell into the hands of Württemberg. Pop. about 43,000.

HEINE (hī'ne), **HEINRICH**, a German poet and author; born of Jewish parents in Düsseldorf, Dec. 13, 1799. He studied law at Bonn, Berlin, and Göttingen; took his degree at the last mentioned place, and in 1825 embraced Christianity. He afterward lived at Hamburg, Berlin, and Munich, but in 1830 he settled in Paris, supported himself by his literary labors, and dwelt there till his death. From 1837 to the overthrow of Louis Philippe in 1848 he enjoyed a pension of $960 from the French Government. Of the numerous literary works of Heine may be mentioned in particular: "Poems"; "Pictures of Travel"; "Book of Songs"; "Germany, a Winter Tale"; "Shakespeare's Maidens and Wives"; "Last Poems and Thoughts"; etc. As a poet Heine is remarkable for the simplicity and pathos of many of his lyric pieces. His powers of wit and raillery were also great. During the latter years of his life he suffered great agony from a spinal complaint, which confined him almost constantly to bed. He died in Paris, Feb. 17, 1856.

HEINZ, HENRY JOHN, an American manufacturer and publicist, born in Pittsburgh, Pa., in 1844. He was educated in the public schools and at Duff's Business College. He began the packing of foodstuffs on a small scale at Sharpsburg, in 1869. In 1872 he removed to Pittsburgh. His business developed rapidly, until it became one of the most important food-producing firms in the country, and had branches also in several countries of Europe. He was a director in many important financial institutions and was chairman of the committee to devise means to protect Pittsburgh from floods. He was a director of the Pittsburgh Tuberculosis Sanatorium and was president of the State Sunday School Association. During the World War he did much important work in connection with the Food Administration. He died in 1919.

HELDER, THE, a seaport in the Dutch province of North Holland, 51 miles from Amsterdam. It is one of the strongest fortresses in Holland, having been first fortified by Napoleon in 1811, and has several naval establishments, including an arsenal and a college, and an excellent harbor. Pop. about 28,000.

HELEN, in classic fable, the daughter of Jupiter and Leda, of Jupiter and Nemesis, or of the King Tyndareus and Leda, his wife, according to the various statements of the poets, was the most beautiful woman of her time, and married Menelaus, King of Sparta. Her guilty elopement with Paris, one of the sons of Priam, King of Troy, who had been sent to Lacedæmon as ambassador, led to the Trojan War, and the destruction, after 10 years' siege, of Troy. On the death of Paris, she married his brother Deiphobus, and when the city was at last sacked, returned to Sparta with her husband Menelaus. Being banished from Sparta on the death of Menelaus, she retired to the island of Rhodes, where, having excited the envy of Polyxo, the queen of the isle, she was tied to a tree and strangled.

HELENA, a city and county-seat of Phillips co., Ark.; on the Mississippi river, and on the Missouri and North Arkansas, the Iron Mountain and Southern, and the Yazoo and Mississippi railroads, 90 miles S. W. of Memphis, Tenn. It has steamship communications with all important river ports, and is a shipping point for lumber, cotton, and cotton-seed oil. Its manufactures include

cotton oil, boxes, cotton goods, machinery, canned goods, and finished lumber. It has electric lights, public schools, public library, the Jefferson High School, Sacred Heart Academy, daily and weekly newspapers, and a National bank. Pop. (1910) 8,722; (1920) 9,112.

HELENA, a city of Montana, and county-seat of Lewis and Clarke co., near Prickly Pear creek, and on the Great Northern, and the Northern Pacific railroads. It is the commercial center of Montana, northern Idaho, and eastern Washington, and has abundant water power from the Missouri river. It has numerous smelting and reduction works, blast furnaces, foundries, machine shops, granite and sandstone works, and does considerable business in mining, farming, and stock-raising. It is the seat of Montana Wesleyan University, Mount St. Charles College, State Capitol, Federal Buildings, Assay Office, St. Vincent's Academy, Orphans' Home, St. Peter's and St. John's Hospitals. The city has electric lights, and electric street railroads connecting with surrounding towns, daily and weekly newspapers, public library, 2 National banks. Pop. (1910) 12,515; (1920) 12,037.

HELICTIS (hel-ik'tis), a genus of carnivorous quadrupeds, allied to the skunks, of which there are at least two species, one (*H. moschata*) found in China, the other (*H. orientalis*) in Nepâl.

HELIGOLAND, or **HELGOLAND** (hel'ig-ä-land), a small island in the North Sea, formerly belonging to Great Britain. It is about 1 mile long from N. to S., and 1-3 of a mile from E. to W.; 1-5 of a square mile in superficial area, and about 2 2-3 miles in circumference. The island consists of an upper and a lower quarter, the Oberland and Sandy Island. A lighthouse stands on a cliff near the village. Heligoland is an important place in time of war, and commands the German trade in the North Sea. The island, which was taken by the English from the Danes in 1807, was formally ceded to Great Britain in 1814, and by Great Britain to Germany in 1890. Pop. about 3,000. The Germans made Heligoland an impregnable fortress and military base. In the Bight the British won a naval victory over the Germans, Aug. 28, 1914. By the terms of the Treaty of Versailles the fortifications of Heligoland were dismantled.

HELIOPOLIS (hēl-ē-op'ō-lis), the On, Rameses, or Beth-shemesh of the Hebrew Scriptures; now called Matarieh; situated a little N. of Memphis; and one of the most ancient and extensive cities of Egypt under the Pharaohs. It had a magnificent temple dedicated to Ra, and communicated with the Nile by lakes and canals. During the flourishing ages of the Egyptian monarchy the priests taught within the precincts of its temples, and both Eudoxus and Plato visited its famous schools. Here Joseph and Mary are said to have rested with the infant Christ. Near the village stands the Pillar of On, supposed to be the oldest Egyptian obelisk, 67½ feet high, and 6 feet broad at the base. The Turks were defeated here by the French in 1800.

HELIUM, a gaseous element. Atomic weight 3·99. Discovered in 1868 by means of the spectroscope, in the sun, by Jannsen and Lockyer, the discovery of terrestrial helium was made later by Ramsay, in the gases evolved from the mineral cleveite. It is widely distributed, but occurs in small quantities. It is present in the air to the extent of about one volume of helium in 250,000 volumes of air, occurs in many minerals, and has been found in the gases from hot mineral springs. Ramsay found that the emanations from radium showed the presence of helium, and it is believed to be the final product of the disintegration of radium. It was considered of purely academic interest until 1915, when the suggestion was made in England that it should be used in place of hydrogen in balloons and airships. Its density is almost twice that of hydrogen, but owing to its chemical inertness and non-inflammability its use for this purpose was thought worthy of consideration. The matter was brought to the attention of the United States Bureau of Mines and this led to the development of the Jefferies-Norton and Linde processes for the extraction of helium from natural gas, which consists mainly of nitrogen, methane and helium. By freezing the gas at a temperature of 318° F. below zero, the other gases become liquified, while helium remains in the gaseous condition, and can be drawn off. A yield of 1 per cent. is considered satisfactory. At the time of the signing of the Armistice, quantities of the gas were loaded on the docks at New Orleans, ready for shipment to France.

HELL, a place of punishment, found, with more or less distinctness, in nearly all ethnic forms of religion, the precise nature of the punishment varying widely. Three definite stages in the concept of hell may be traced: (1) a vague notion of a future life, to be spent in misery, with little or no idea of moral retribution; (2) it ranks as a place of torment for those

who have offended the gods, but is conceived as limited in duration; and (3) it becomes an important factor in the moral government of the universe, a place where evil deeds done in this life are rigorously punished. In the Old Testament used chiefly for Hades, as in Psalm xviii: 5, cxvi: 3, cxxxix: 8, Prov. v: 5, Isa. xiv: 9; Hab. ii; 5. More rarely in the New Testament it is used in the same sense, as in Acts ii: 31 with reference to Psalm xvi: 10, and apparently in Rev. i: 18, vi: 8, xx: 13, 14, though the language is mostly figurative. In the Apostles' Creed the article "He descended into hell" means into Hades. This sense of the word is now obsolete, except in old formulas or other archaic writings. The place of woe. This is the common New Testament sense of the word, and is the rendering of Greek *Geenna* (Gehenna). Of those cast into it Jesus says, "Where their worm dieth not, and their fire is not quenched" (Mark. ix: 44, 46-48), the language being adapted from Isa. lxvi: 24. This fire is said to be everlasting fire, prepared for the devil and his angels (Matt. xxv: 41).

HELLEBORE (hel'ä-bōr), in pharmacy, the dried rhizome of *Veratrum viride*, growing in swampy districts of the United States. It is used to control the vascular system in cases of rheumatic gout.

HELLENES (hel'ēns), the native name of the ancient Greeks.

HELLESPONT. See DARDANELLES.

HELL GATE, a formerly dangerous pass in the east river, at New York City. Rocks here used to form an obstruction much dreaded by mariners, but by extensive submarine mining operations and the use of the most powerful explosives, the passage was cleared. The channel has a uniform depth of 26 feet.

HELMET, a piece of defensive armor for the head; a defensive covering for the head.

HELPS, SIR ARTHUR, an English historian; born in Streatham, Surrey, July 10, 1813; was graduated at Cambridge in 1835. His works comprise an early volume of essays: "Thoughts in the Cloister and the Crowd" (1835); "Catherine Douglas, a Tragedy" (1839); "Essays Written During the Intervals of Business" (1841); "Claims of Labor" (1844); the series entitled "Friends in Council" (1847-1859); "Companions of My Solitude" (1851); "Brevia" (1871); "Conversations on War" (1871); "Thoughts on Government" (1872); "Animals and Their Masters" (1873); "Social Pressure" (1875); "Spanish Conquest of America" (1855-1861); lives of "Pizarro" (1869); and "Cortes" (1871); "Realmah, a Romance" (1868); and "Ivan de Brion, a Russian Story" (1874). He died in London, March 7, 1875.

HELSINGFORS, a seaport and capital of Finland, on a peninsula in the gulf of that name, 180 miles W. N. W. of St. Petersburg. Helsingfors is the residence of the governor, the seat of important courts and public offices, and contains a university removed from Abo in 1827. It has manufactures of linen, sail-cloth, and tobacco, an important trade in timber, corn, and fish, and one of the best harbors in the Baltic. Pop. with Sveaborg (1917) 187,544.

HEMANS, FELICIA DOROTHEA, an English poet; born in Liverpool in 1794. She first appeared as an author in 1808, with a volume entitled "Early Blossoms," which was followed in 1812 by her more successful volume, "The Domestic Affections." In the same year she married Captain Hemans, who, however, left her six years later, shortly before the birth of her fifth son. She then devoted herself to literature, winning public notice by her poems. In 1830 she published one of her most popular volumes, "Songs of the Affections." In 1831 she removed to Dublin, where she published her "Hymns for Childhood," "National Lyrics and Songs for Music," and "Scenes and Hymns of Life." She died in 1835.

HEMATITE. See HÆMATITE; IRON.

HEMATOLOGY, or HÆMATOLOGY. See BLOOD.

HEMORRHAGE. See BLEEDING.

HENDERSON, a city and county-seat of Henderson co., Ky., on the Ohio river, and on the Louisville and Nashville, the Illinois Central, and the Louisville, Henderson and St. Louis railroads: 10 miles S. of Evansville, Ind. It is in a rich timber, coal, and salt region; has regular steamboat connection with Louisville, Memphis, and other points; and ships large quantities of tobacco and grain. It contains several tobacco and cigar factories, foundries, car-works, carriage and wagon factories, waterworks, handsome fair-grounds, grist, saw, and planing mills, woolen and churn factories, daily and weekly newspapers, a National bank, electric lights, and street railways. Pop. (1910) 11,452; (1920) 12,169.

HENDERSON, ARTHUR, an English labor leader. He was born at Glasglow in 1863, and served apprenticeship as a molder at Robert Stephenson and Co.'s works at Newcastle, later holding a num-

ber of official positions in connection with his Trade Society and the Trade Union Movement. Was a member of the Newcastle City Council, Darlington Borough Council, and Mayor, 1903. Was chosen as colleague for John Morley at Newcastle in 1895 but withdrew. In 1903 was elected as labor M. P. to represent Barnard Castle Division, Durham, in the House of Commons, holding the seat till 1918. He was a member of the War Cabinet, President of the Board of Education, and Paymaster-General.

HENDON, a suburban town of England outside of London, 8 miles from St. Paul's Cathedral, on the banks of the Brent. Its claim to distinction is the fact that here were located the aerodromes of the first aeroplanes which flew in England, before the World War, making of Hendon the center of the national interest in aeroplane events. Here were conducted the many tests of new-type machines, whose feats added extensively to the general experience in the art of flying.

HENDRICKS, THOMAS ANDREWS, Vice-President of the United States; born near Zanesville, O., Sept. 7, 1819; was graduated at South Hanover College, Indiana, in 1841; went to Chambersburg, Pa., studied law in the office of his uncle and was admitted to the bar in 1843. In 1845 he was sent to the Legislature, and in 1850 and 1852 was elected to Congress. In 1860 he was the Democratic candidate for governor of Indiana, but was defeated by Henry S. Lane. In 1863-1869 he was a United States Senator; and at the Democratic National Convention of 1868 received 132 votes (second highest) for the presidential nomination. In the same year he was again defeated for the governorship of Indiana, but in 1872 was elected. In the Democratic National Convention of 1876 he received 133½ votes for the presidential nomination, and a practically unanimous vote for the vice-presidential. The Democratic ticket, headed by Tilden, was, however, defeated. In 1884 Hendricks was again nominated for the vice-presidency, and this time the Democrats were victorious, and Cleveland and Hendricks were elected. He died in Indianapolis, Ind., Nov. 25, 1885.

HENG-KIANG (heng-kē-ang′), a river of China, falling from the N. W. into the Yang-tse-kiang. In its course of 300 miles it has several large cities on its banks.

HENLEY, WILLIAM ERNEST, an English poet and editor; born in Gloucester, Aug. 23, 1849. Months of sickness in Edinburgh Infirmary (1873-1875) bore fruit in "A Book of Verses" (1888), which won much attention, and was followed by "Views and Reviews" (1890); "The Song of the Sword" (1892); "English Lyrics" (1897); "Poems" (1898); etc. He has also been editor of the "Magazine of Art"; the "Scots (or "National") Observer"; and the "New Review"; besides editing Burns and Byron. He collaborated with R. L. Stevenson in three plays, "Deacon Brodie"; "Beau Austin"; and "Admiral Guinea." He died in 1903.

HENLEY-ON-THAMES, a municipal borough of Oxfordshire, at the base of the Chiltern Hills, and on the left bank of the Thames; 36 miles W. of London. The five-arch bridge was built in 1786 at a cost of $50,000. Malting is a principal branch of industry; there are also breweries, and a considerable trade in corn, flour, and timber. The principal amateur regatta of England has been held here every summer since 1839.

HENRIETTA, MARIA, queen of Charles I. of England; youngest child of Henry IV., of France, by his second wife, Maria de' Medici; born in Paris in 1609. The proposed marriage between Charles, Prince of Wales, and the Infanta of Spain having failed, a matrimonial negotiation was opened with Henrietta, whom he had first met at a ball in Paris while on his way to Spain. The marriage was celebrated by proxy at Paris in 1625, but her first popularity in England was soon destroyed by her bigotry, hauteur and despotic ideas as to divine right. Much of the subsequent procedure which brought Charles to the block may be traced indirectly to her influence. On the breaking out of civil war she proceeded to Holland, procured money and troops, and afterward joined Charles at Oxford. She again went to the Continent in 1644, and resided in France till the Restoration. On that occasion she visited England, but soon returned to France, and died near Paris in 1669.

HENRY, a name borne by various European rulers as follows:

ENGLAND.

HENRY I., surnamed Beauclerc ("fine scholar"), youngest son of William the Conqueror; born in Selby in Yorkshire, in 1068. He was hunting with William Rufus when that prince was killed, in 1100, and instantly riding to London, caused himself to be proclaimed king, to the prejudice of his elder brother Robert, then absent as a Crusader. He re-established by charter the laws of Edward the Confessor, recalled Anselm to the primacy, and married Matilda,

daughter of Malcolm III. of Scotland, thus conciliating in turn the people, the Church, and the Scots. Robert landed an army, but was pacified with a pension, and the promise of succession in event of his brother's decease. Soon after, however, Henry invaded Normandy, took Robert prisoner in 1106, and reduced the duchy. He was successful also in the struggle with France. The last years of his reign were very troubled. In 1120 his only son William was drowned in returning from Normandy, where, three years later, a revolt occurred in favor of Robert's son. The Welsh also were a source of disturbance. Henry appointed as his heir his daughter Matilda or Maud, whom he had married first to the Emperor Henry V., and then to Geoffrey Plantagenet of Anjou. Henry died at Rouen in 1135, and was succeeded by Stephen.

HENRY II., first of the Plantagenet line, born in Normandy in 1133, son of Geoffrey, Count of Anjou, and Matilda, daughter of Henry I. He was invested with the Duchy of Normandy, by the consent of his mother, in 1150; in 1151 he succeeded to Anjou and Maine, and by a marriage with Eleanor of Guienne gained Guienne and Poitou. In 1152 he invaded England, but a compromise was effected, by which Stephen was to retain the crown and Henry to succeed at his death, which took place in 1154. The commencement of his reign was marked by the dismissal of the foreign mercenaries; and though involved with his brother, Godfrey, who attempted to seize Anjou and Maine, and in a temporary dispute with France, he reigned prosperously till the contest with Thomas Becket regarding the Constitutions of Clarendon. Though sufficiently submissive after Becket's death in the way of penance and expiation, Henry only gave up the article in the Constitutions of Clarendon which forbade appeals to the court of Rome in ecclesiastical cases. Before this matter was terminated, Henry, in 1171, completed the conquest of Ireland, a great part of which had been reduced by Richard de Clare, Earl of Pembroke, commonly known as Strongbow. Henry's last years were embittered by his sons, to whom he had assigned various territories. The eldest son, Henry, who had been not only declared heir to England, Normandy, Anjou, Maine and Touraine, but actually crowned in his father's lifetime, was induced by the French monarch to demand of his father the immediate resignation either of the kingdom of England or of the dukedom of Normandy. Queen Eleanor excited her other sons, Richard and Geoffrey, to make similar claims; Louis and William of Scotland gave them support; and a general invasion of Henry's dominions was begun in 1173 by an attack on the frontiers of Normandy, and an invasion of England by the Scots, attended by considerable disturbance in England. Conciliating the Church by his penance, Henry took prompt action; William of Scotland was captured, and an accommodation arrived at with Henry's sons. These, however, once more became turbulent, and though the deaths of Henry and Geoffrey reduced the numbers of centers of disturbance, the king was forced to accept humiliating terms from Richard and Philip of France. He died shortly after at Chinon in 1189. He ranks among the greatest English kings both in soldiership and statecraft.

HENRY III., eldest son of King John and Isabella of Angoulême; born in Winchester, in 1207. He succeeded his father in 1216. The regency was intrusted to William Marshal, Earl of Pembroke, who, in 1217, defeated the French army at Lincoln, and compelled the dauphin Louis to retire to France. On Pembroke's death, in May, 1219, Hubert de Burgh and Peter des Roches, Bishop of Winchester, became regents; but mutual jealousies and dissensions disturbed their administration and weakened their power. Henry was crowned a second time, in 1220, and two years later was declared of age, but his feebleness of character unfitted him to rule, and the real power remained with his ministers. His fondness for foreign counsellors, his unsuccessful wars with France, and his attempts to govern without parliaments, excited much ill-humor in the nation. This was increased by the heavy impositions on his subjects, made necessary by his acceptance of the crown of Sicily for his son Edmund. At length, in 1258, he was virtually deposed by the "Mad Parliament," which assembled at Oxford, and a council of state was formed under the presidency of Simon de Montfort. The popular leaders quarreled among themselves, while the king was a prisoner in their hands. But in 1262 civil war began, the king being compelled to employ foreign mercenaries. In 1264 the battle of Lewes was fought, at which the king, Prince Edward, Earl Richard, king of the Romans, and his son Henry, were made prisoners by the barons. Soon after, De Montford, now virtually sovereign, summoned a Parliament, which met in January, 1265, and was the first to which knights of the shires and representatives of cities and boroughs were called; thus constituting the first House of Commons. In August of that year

De Montfort was defeated and killed by Prince Edward, at the battle of Evesham, and the king regained his liberty. But the war lasted two years longer. In 1270 Prince Edward set out on the crusade, and before his return Henry died at Westminster, Nov. 16, 1272.

HENRY IV. (called Bolingbroke), Duke of Hereford, and eldest son of John of Gaunt, Duke of Lancaster; born in Bolingbroke in Lincolnshire, 1366. Having deposed his cousin, Richard II., in 1399, ascended the throne as Henry IV. This usurpation gave rise to the civil war between the houses of York and Lancaster, which broke out under the sway of Henry VI. His reign was disturbed by a rebellion headed by the Duke of Northumberland and his son Percy, surnamed "Hotspur." After subduing all opposition, Henry IV. died overwhelmed with remorse for many of his unscrupulous deeds, in 1413.

HENRY V. (surnamed Monmouth), one of the most illustrious of the line of English sovereigns, and whose early life of riot and dissipation gave but little promise of his after virtues; born in 1388, ascended the throne on the death of his father, Henry IV. In obedience to the dying advice of his parent, to give the public mind employment, he declared war against France, laying claim to that throne in right of his ancestors, and at once led a powerful army to the invasion of that kingdom; and after taking Harfleur and devastating the northern provinces, fought and won the glorious battle of Agincourt. To check Henry's further progress and avert the total ruin of his country, the French monarch concluded a truce with Henry, who, to ratify the arrangement, espoused Charles' daughter, the Princess Catharine. No king ever sat on the English throne who was more beloved and honored than the gallant Harry "Monmouth." He died in 1422.

HENRY VI., the only son of the above; born 1421, was but ten months old at the death of his father, and was proclaimed king on the day after that event. His grandfather, Charles VI., King of France, died soon after, and the Duke of Orleans assumed the title of king by the name of Charles VII. This renewed the war between England and France, and the English, for a while, were successful. Henry was crowned at Paris, and the great Duke of Bedford, his guardian, obtained several important victories. But the raising of the siege of Orleans by Joan of Arc gave a new turn to affairs, and the English power declined, and was, in the end, quite subverted. The death of the Duke of Bedford was a fatal blow to the cause of Henry; and, to add to his misfortunes, the York party in England grew strong, and involved the country in a civil war. They adopted the white rose as their badge of distinction, and the Lancastrians the red. Hence the title given to the struggle—"the War of the Roses." After various contests, the king was defeated, and taken prisoner. However, his wife, Margaret of Anjou, carried on the war with spirit, and for some time with considerable success. Richard, Duke of York, was slain at Wakefield, and Henry recovered his liberty; but Edward, Earl of March, son of Richard, laid claim to the crown, and routed the queen's forces at Ludlow, but was himself afterward defeated at St. Alban's. At length the York party prevailed, and Henry was sent to the Tower, where it is believed, he was slain by Richard, Duke of Gloucester. He was found dead in the Tower in 1471.

HENRY VII. (Tudor), son of Edmund, Earl of Richmond, and of Margaret, of the house of Lancaster, born in 1456. By the assistance of the Duke of Brittany, he landed in Wales with some troops, and laid claim to the crown in 1485. The people, disgusted at the cruelties of Richard III., joined him in such numbers that he was enabled to give the usurper battle at Bosworth Field, where Richard was slain, and Henry crowned on the spot. He united the houses of York and Lancaster by marrying Elizabeth, daughter of Edward IV. His reign met with little disturbance, except from two impostors, set up by Lady Margaret, sister to Edward IV. One was a joiner's son, called Lambert Simnel, who personated Richard, Duke of York, who had been murdered by the Duke of Gloucester in the tower. On being taken prisoner, Henry made him a scullion in his kitchen. The other was Perkin Warbeck, who said he was the Duke of York; but he was soon taken, and hanged at Tyburn. Henry reigned 24 years, and greatly increased trade and commerce; but his avarice was excessive. He died in 1509.

HENRY VIII., born in 1491; succeeded his father, Henry VII., at the age of 19. The first years of his reign were auspicious owing to his generosity; but at length his conduct grew capricious and arbitrary. The Emperor Maximilian and Pope Julius II., having leagued against France, persuaded Henry to join them, and he, in consequence, invaded that kingdom, where he made some conquests. About the same time, James IV., King of Scotland, invaded England, but was defeated and slain at Flodden Field. Cardinal Wolsey succeeded in bringing Henry over from the imperial interests to those of the French king. When Lu-

ther commenced his reformation in Germany, Henry wrote a book against him, for which he was complimented by the Pope with the title of "Defender of the Faith." But this attachment to the Roman see did not last long; for, having conceived an affection for Anne Boleyn, he determined to divorce his wife, Catharine of Aragon, to whom he had been married 18 years. His plea for the divorce was that Catharine was his brother Arthur's widow. The divorce being refused by the Pope, Henry assumed the title of Supreme Head of the English Church, put down the monasteries, and alienated their possessions to secular purposes. His marriage with Anne Boleyn followed; but he afterward sent her to the scaffold, and married Lady Jane Seymour, who died in child-bed. He next married Anne of Cleves; but she not proving agreeable to his expectations, he put her away, and caused Cromwell, Earl of Essex, the projector of the match, to be beheaded. His next wife was Catharine Howard, who was beheaded for adultery; after which he espoused Catharine Parr, who survived him. He was a man of strong passions and considerable learning. The historian Froude has vindicated his memory in many respects. He died in 1547.

FRANCE.

HENRY I., born in 1004, succeeded his father, Robert I., in 1031, and died in 1060, after a reign of 23 years, frequently disturbed by civil and foreign wars.

HENRY II., son of Francis I. and his queen, Claude, born 1518. His marriage with Catharine de Medicis was celebrated at Marseilles, in 1533, by her uncle, Pope Clement VII. Henry succeeded his father in 1547, and at once made a complete change in the court and ministry. The most influential persons in his reign were the Cardinal of Lorraine and his brother Francis, Duke of Guise, the Constable de Montmorenci, the Marshal de St. André, and Diana of Poitiers, the king's favorite mistress, whom he made duchess of Valentinois. He carried on war with England, and recovered Boulogne for France; war with the Pope and with Spain; fighting for the Protestants in Germany, while he persecuted them in France; acquired by conquest Metz, Toul, and Verdun; and retained them under the treaty of Cateau-Cambrésis, which closed the war in 1559. By the same treaty Calais was confirmed to France. The siege of Metz by Charles V., and its defense by the Duke of Guise; the battle and siege of Renti; the great victory of the Spaniards at St. Quentin; and the battle of Gravelines, are the chief military events of this reign. Mary, the young queen of Scots, was brought to France about 1549 and betrothed to the dauphin François. Henry died in July, 1559, from the effects of a wound accidentally inflicted by the Count of Montgomery at a splendid tournament a few days before.

HENRY III., third son of Henry II. and Catharine de Medicis; born in 1551. He was first known as Duke of Anjou, and distinguished himself as a soldier at the battle of Jarnac and Moncontour. He was elected King of Poland in 1573, but being proclaimed King of France on the death of Charles IX., in 1574, he escaped, not without risk, from Poland, and returned to France. The country was distracted with the conflicting factions, and wasted with civil war; and the king, feeble in character and self-indulgent, was governed by ignoble favorites. The famous Catholic League was formed, with the Duke of Guise at its head; Henry of Navarre put himself at the head of the Huguenots, and won the battle of Coutras; Paris fell into the power of the League in 1588, and the king fled to Chartres and Rouen; later in the same year he convoked the states-general at Blois, and there had the two Guises assassinated, a crime which excited the revolt of Paris and the principal cities of the kingdom. The Duke of Mayenne was named by the League lieutenant-general of the royal estate and crown of France, and Henry, roused at last to action, joined his rival, Henry of Navarre, and advanced to besiege Paris. At St. Cloud, which he made his headquarters, he was stabbed by a fanatic, Jacques Clement, and died the day after, Aug. 1, 1589. Henry III. left no children, and was the last sovereign of the Valois line.

HENRY IV. (Quatre), called The Great, King of France and Navarre; born in 1553 in Pau, in Béarn. His father, Anthony of Bourbon, was descended from a son of Louis IX.; his mother was Jeanne d'Albret, daughter of Henry, King of Navarre. He was brought up in the simple and hardy manner of the peasantry of Béarn, and thus laid the foundation of a vigorous constitution and temperate habits. When the perfidious design of destroying the Huguenot chiefs by a massacre was formed by Charles IX. and his mother, Catherine, one of their means to lull suspicion was to propose to Queen Jeanne a marriage between Henry and Margaret of Valois, the king's youngest sister. While preparations were making for the marriage festival, Henry's mother died at Paris, not without strong suspicions of poison. Having assumed the title of King of Navarre, his marriage took place, Aug. 18,

1572. Then followed the horrible scenes of St. Bartholomew, Aug. 24. Henry was obliged to make a profession of the Catholic faith to save his life; but Catharine of Medicis endeavored to dissolve the marriage just celebrated. As she was unsuccessful in this, she adopted the plan of corrupting the noble youth by the pleasures of a licentious court; and he did not escape the snare. In 1576, however, he took advantage of a hunting excursion to quit the court, and professed himself again of the Protestant Church. Catharine, who after the decease of Charles IX., administered the government in the name of his successor, Henry III., now thought it advisable to conclude a treaty of peace with the Huguenots (1576), securing to them religious freedom. Exasperated by this event, the Catholics formed the celebrated League, which Henry III. was obliged to confirm; and the religious war was recommenced. In 1587 Henry obtained a victory over the Catholics at Coutras, in Guienne. In 1589, on the assassination of Henry III., Henry of Navarre succeeded to the throne; but he had to secure his claim by hard fighting and by the profession of the Catholic faith. The same year he won the victory of Arques, and the following year that of Ivry, over the forces of the League, headed by the Duke of Mayenne. After a protracted and obstinate struggle, convinced that he should never enjoy quiet possession of the French throne, without professing the Catholic faith, Henry at length yielded to the wishes of his friends, was instructed in the doctrines of the Roman Church, and professed the Catholic faith, July 25, 1593, in the Church of St. Denis. He happily escaped an attempt to assassinate him; was solemnly anointed king at Chartres in 1594; and entered the capital amid the acclamations of the people. Peace was not fully re-established till 1598, when the treaty of Vervins was signed. In 1610, while riding through the streets of Paris, his coach was obstructed in the Rue de la Feronnerie by two wagons. A fanatic named Ravaillac took advantage of the moment to perpetrate a long meditated deed; and the king received a fatal stab from the hand of this assassin, in the 57th year of his age and the 27th of his reign.

HENRY V. OF FRANCE. See CHAMBORD.

GERMANY.

HENRY I., surnamed the Fowler, Emperor of Germany, born in 876, was the son of Otho, Duke of Saxony, and elected to the imperial dignity in the year 918. He reunited the German princes, and subdued the Hungarians, formed good laws, and built several cities. He vanquished the Bohemians, the Slavonians and the Danes, and conquered the kingdom of Lorraine. He died in 936.

HENRY II., great-grandson of the preceding; born 972. He succeeded his father as Duke of Bavaria, and in 1002 was elected King of Germany, and crowned at Mentz and at Aix-la-Chapelle. Two years later he was crowned King of Lombardy at Pavia, his rival, Hardouin, avoiding a combat with him. He was engaged in frequent wars, in Italy, in Bohemia, Bavaria, etc. In 1014 he received the imperial crown at Rome, his wife, Cunegunde, being crowned with him. They were both distinguished for their piety and devotion to the Church, and were canonized. He died in 1024.

HENRY III., son of the Emperor Conrad II.; born in 1017; succeeded his father in the imperial dignity in 1039. Nature had given him the talents, and education the character, suitable for an able ruler. In everything he undertook he displayed a steady and persevering spirit; the clergy were compelled to acknowledge their dependence on him, and the temporal lords he held in actual subjection. He deposed three popes, and raised Clement II. to the vacant chair; and he was as successful in his wars as in his administration. He died in 1056.

HENRY IV., son of the preceding; born in 1050, and at the death of his father was only five years old. His mother, Agnes, was made regent, and on her death the chief power was seized by his uncles, the Dukes of Saxony and Bavaria. Henry made war on them, and threw off their yoke. He, however, offended his subjects by the licentiousness of his manners, and quarreled with the Pope, Gregory VII., about investitures. The latter being appealed to in a subsequent dispute between Henry and the Duke of Saxony, cited Henry to his tribunal, who then deposed the Pope, to be in turn excommunicated by him. The emperor was compelled to submit, went to Canossa, where the Pope then was, and after being kept three days in the courtyard, received absolution. The quarrel was soon renewed, deposition, excommunication, and election of new popes and emperors followed. Henry's eldest son, Conrad, rebelled against him, but was overcome, and died in Florence in 1101. He then caused his second son, Henry, to be elected his successor, and crowned; but the latter also rebelled, and making himself master of his father's person, in 1106, by stratagem, compelled him to abdicate the throne. Henry IV. died in 1106.

HENRY V., the son and successor of the preceding; born in 1081. In 1106 he

rebelled against his father, and dethroned him, assuming the imperial crown in his stead. In 1111 he married Matilda, the daughter of Henry I., King of England; and the rich dowry he received with his princess gave him the means of undertaking an expedition to demand the imperial crown from the Pope. Finding that Pascal refused to crown him, Henry caused the Pope to be conveyed away from the altar while at mass; and cut down, in the streets of Rome, all who opposed him. At length the Pope yielded, and Henry was crowned in 1112, without making any new concessions. Soon after his return to Germany the Pope excommunicated him; which led to a new war, the invasion of Italy, and the election of a rival Pope. Peace was not made till 1122, when the emperor renounced his claims. He died in 1125.

HENRY VI., son of Frederick Barbarossa; born in 1165. He was elected King of the Romans when four years of age, and succeeded his father on the imperial throne in 1190. The same year, on the death of William II., King of Sicily, he claimed that crown in right of Constance, his wife, daughter of King Roger. After being crowned at Rome with his wife in 1191, he made an unsuccessful attempt to conquer Naples. In 1193 he gave Leopold, Duke of Austria, a small price to hand over to his keeping his royal prisoner, Richard I. of England, whom he detained nearly a year, and released for a heavy ransom. With this money he undertook another expedition against Sicily and succeeded. He was crowned at Palermo in 1194. A revolt broke out in consequence of his tyranny, and he returned to suppress it. He died in Messina in 1197.

HENRY VII., succeeded Albert I. in 1308. He undertook an expedition to Italy, and compelled the Milanese to crown him King of Lombardy. He then suppressed a revolt which had broken out in upper Italy; took several cities by storm; and, having captured Rome, he was crowned Roman emperor by the cardinals sent from Avignon, while in the streets the work of murder and pillage was still going on. He died in 1313.

HENRY (RAPSON), LANDGRAVE OF THURINGIA, was elected Emperor by the ecclesiastical princes in 1246, when Pope Innocent IV. deposed Frederick II. He died in 1247 of a wound received fighting his rival.

HENRY, surnamed THE NAVIGATOR, a Portuguese prince; born in Oporto in 1394. The ambition of Henry was the discovery of unknown regions of the world. At Sagres he erected an observatory, to which he attached a school for the instruction of youthful scions of the nobility in the sciences necessary to navigation. Subsequently he dispatched some of his pupils on voyages of discovery, which resulted at last in the discovery of the Madeira Islands in 1418. Henry's thoughts were now directed toward the auriferous coasts of Guinea, of which he had heard from the Moors; and in 1433 one of his mariners sailed round Cape Nun, till then regarded as the farthest point of the earth, and took possession of the coasts as far S. as Cape Bojador. Next year Henry sent out a larger ship, which reached a point 120 miles beyond Cape Bojador; and at last, in 1440, Cape Blanco was reached. Henry died in 1460.

HENRY, PATRICK, an American patriot; born in Hanover co., Va., May 29, 1736. He entered business and married at 18. Having failed successively in "store-keeping" and in farming, he became a lawyer in 1760, and three years later found his opportunity, when, having been employed to plead the cause of the people against an unpopular tax, his great eloquence seemed suddenly to develop itself. This defense placed him at once in the front rank of American orators, and his later speeches advanced him to their head. Throughout the Revolutionary War he was a zealous patriot. He was a delegate to the 1st Continental Congress, which met in Philadelphia in 1774, and delivered the first speech in that assembly—a speech that for fiery eloquence and lofty tone was worthy of so momentous a meeting. In 1776 he carried the vote of the Virginia convention for independence; and in the same year he became governor of the new State. In 1791 he retired from public life, and returned to his practice; in 1795 he declined the secretaryship of State offered him by Washington. He died June 6, 1799.

HENRY, FORT, an ancient fort erected on the site of the present town of Petersburg, Va., in 1646.

HENTY, GEORGE ALFRED, a popular English novelist and writer for boys; born in Trumpington, Cambridgeshire, Dec. 8, 1832. He was editor of "Union Jack," a journal for boys, and has been special war correspondent of the London "Standard" in various quarters of the globe. A voluminous writer, among his works are: "The Young Franc-Tireurs," "Winning His Spurs," "Facing Death," "The Lion of St. Mark's," "In the Hands of the Cave Dwellers," "Lost Heir," and some 70 others. He died in 1902.

HEPTARCHY (hep'tar-kë), the name sometimes applied to the seven kingdoms supposed to have been established by the Saxons in England. This is understood to mean only that the chief kingdoms at various periods from the 5th to the 9th century were Wessex, Sussex, Kent, Essex, East Anglia, Mercia and Northumberland.

HERALDRY, properly the knowledge of the whole multifarious duties devolving on a herald; in the more restricted sense it is the science of armorial bearings. The rules of heraldry differ somewhat in different countries, but the general principles are the same. In English heraldry, arms are divisible into three classes: Arms of states, of communities or corporations, and of persons and families. All these classes of arms are displayed on a shield or escutcheon. There is no prescribed form for the shield. The shields of maids and widows are in the form of a lozenge. The face of the shield, on which the arms are blazoned, is technically called the field.

HERAT (her-ät'), a city of Afghanistan, and capital of an independent state; in a plain near the Herirood river, 360 miles W. by N. of Kabul. It is well fortified, and surrounded by a wet ditch, mound, and bastioned wall. It contains a number of caravanseries, public baths, reservoirs, and numerous mosques, besides a strong citadel. Herat is the emporium of the commerce carried on between Kabul and Bokhara, Hindustan, and Persia, and is a grand central mart for the products of India, China, Tartary, Afghanistan, and Persia. The local manufactures include carpets, leather, caps, cloaks, shoes, etc. This place has often been ravaged by various conquerors disputing the empire of Asia. The position of Herat is one of the greatest possible importance, and has been well described as the "Gate of India"; for within the limits of the Heratee country all the great roads leading to India converge. By the Herat route alone could a formidable and well-equipped army march upon the Indian frontier from the N. W. regions. Pop. about 20,000. See AFGHANISTAN.

HERBERT, GEORGE, an English poet, brother of Lord Herbert of Cherbury; born in 1593. He was educated at Trinity College, Cambridge. From 1619 till 1627 he was university orator. The death of James I. in 1625 put an end to his prospects of civil promotion, and in the same year he took orders, and became a prebendary in the diocese of Lincoln. In 1630 he took priest's orders, and was presented to the rectory of Bemerton, near Salisbury, in Wiltshire. His collection of religious poems, "The Temple," was published in 1631 and the "Jacula Prudentum," a collection of proverbs, in 1640. His chief prose work was "The Country Parson" (1652). He died in 1633.

HERCULANEUM (her-kū-lā'nē-um), an ancient city about 5 miles from Naples, completely buried with Pompeii by lava and ashes during an eruption of Vesuvius in the reign of Titus, A. D. 79.

HERCULES (her'kū-lēz), or **HERACLES**, the beloved son of Zeus by Alcmene, was intended by his father to be king of the Argives; but Hera, the jealous spouse of Zeus, by a trick caused Eurystheus to become king of Argos. Nor was her wrath satisfied with this; she made Hercules serve Eurystheus, by far the inferior man. And he enjoined hard adventures on Hercules, even sending him to Hades to fetch up the dog Cerberus. Thus Hercules was doomed to a life of trouble, and became the type among the Greeks not only of manly strength, but of manly endurance. Besides the labors imposed on him by Eurystheus, Hercules undertook adventures on his own account, killing a sea monster that ravaged Troy, and destroying Troy when the mares promised him as reward for killing the monster were denied him. His love of horses also led him to kill Iphitus, though his guest. Finally, after death, he himself joined the banquet of the deathless gods, with Hebe as his wife; but his phantom, armed with bow and arrow and gold baldric, with wild boars and lions wrought upon it, terrified the dead in Hades.

HEREDITY, the transmission from parent to offspring of physical and intellectual characters.

HEREFORD, the county-town of Herefordshire, England, 144 miles W. N. W. of London. Its noble cathedral was built between 1079 and 1535, and so exhibits every variety of style from Norman to Perpendicular.

HERETIC, one who adopts, and probably propagates, religious views which the Church to which he belongs, or the Christian Church in general, deems erroneous, and imperiling the eternal salvation of anyone holding them. Heresies began in the Apostolic age. There were, for instance, Hymeneus and Philetus, who said that the resurrection was already past (II Tim. ii: 17), and apparently the Nicolaitanes, though they are censured for hateful deeds rather than doctrines (Rev. ii: 6). The Scripture direction for dealing ecclesiastically

with heresies is given in Titus iii: 10: "A man that is an heretick after the first and second admonition reject." When the Church gained an influence over the civil power, it induced the latter to superadd civil to the ecclesiastical penalties for heresy. Those who differed from the opinions of the imperial house received many kinds of ill usage, but it was not till A. D. 382 that a law of Theodosius I., directed against the Manichæans, authorized capital punishment for heresy. This law led to the execution at Treves, in A. D. 385, of Priscillian, Bishop of Avila; he is believed to have been the first person put to death by a Christian government for heresy.

HEREWARD (her'e-) commonly called HEREWARD THE WAKE, an English yeoman or squire who held the Isle of Ely against William the Conqueror in 1070-1071. When William had succeeded in encompassing the English patriots and penetrating to their camp of refuge, Hereward, scorning to yield, cut his way through to the fastnesses of the swampy fens N.

HERISTAL (hā'ris-täl) or **HERSTAL**, (hers'-), an industrial town of Belgium, on the Meuse, immediately N. E. of Liège, of which it is virtually a suburb. It is mostly inhabited by workmen, who find employment in the coal mines and the iron and steelworks. Ruins still exist of the castle of Heristal, the birthplace of Pepin, the mayor of the palace; and his great-grandson Charlemagne frequently resided here.

HERKIMER, a village of New York, the county-seat of Herkimer co. It is on the Mohawk river and on the Erie and Barge canals, and on the New York Central and Hudson River and the Otsego and Herkimer railroads. It is the center of an important dairying region and has manufactures of knit goods, office desks, beds, furniture, paper boxes, mattresses, etc. Pop. (1910) 7,520; (1920) 10,453.

HERKOMER, SIR HUBERT, an English painter; born in Waal, Bavaria, May 26, 1849. At an early age he settled with his parents in the United States and subsequently in England. He joined the Institute of Painters in Water Colors in 1871. His oil picture, "After the Toil of Day," in the Academy exhibition of 1873, was followed by his "Last Muster," which gained him the "grand medal of honor" at the Paris Exhibition of 1878. He was in 1879 elected an A. R. A. After 1880 he devoted much time to portraiture, and his portrait of Miss Grant is one of his many successes in that branch of art. He founded the Herkomer School of Art, at Bushey, in 1883; was elected a Royal Academician in 1890; was Slade Professor of Fine Arts at Oxford in 1885-1895; and was elected an Associate of the French Academy of Fine Arts in 1895. He died in 1914.

HERMANNSTADT (her'män-stät), a town of Rumania, formerly capital of Transylvania, 370 miles S. E. of Pest. It consists of an upper and a lower town, the walls, towers, and bastions formerly surrounding which have only recently been demolished. Hermannstadt is the seat of a Greek archbishop and of a "Saxon" university. The fine Bruckenthal palace contains a picture-gallery, numismatic, antiquarian, and mineral collections, and a library of 30,000 volumes. Tanning, wax-bleaching, and the making of cloth, paper, candles, sugar, and hats are carried on. Hermannstadt was originally the seat of a German colony, founded in the reign of Gesa II. (1141-1161), and was at first called Villa Hermanni. It endured several sieges from the Turks (1438 and 1442), as well as one from the followers of John Zapolya (1526). It also suffered at the hands of Gabriel Bathori in 1610, and again from both combatants during the Russo-Hungarian War of 1849. Pop. about 25,000.

HERMES (hur'mēz), in Greek mythology, Mercury, the god of speech, eloquence, the sciences, traffic, theft, and herds, the herald and messenger of the gods. The Hermes of archæology is a rough quadrangular stone or pillar having a head, usually of Hermes or Mercury, sculptured on the top, without arms or body, placed by the Greeks in the front of buildings, and used by Romans as landmarks.

HERMOSILLO (her-mō-sēl'yō), a capital of the Mexican State of Sonora, in a fertile plain on the Rio Sonora, 50 miles N. of Guaymas. It has a mint and other government buildings, a bank of issue, sawmills, distilleries, and shoe and furniture factories, and a large export trade in wheat and wine. Pop. about 15,000.

HERNIA, the protrusion of some portion of the intestinal canal, or, in a more general sense, of any organ or part of an organ, from its natural place. It may arise from over-exertion, from a blow, etc. There are many varieties of hernia, as, the diaphragmatic, the entero-vaginal, the mesenteric, the mesocolic, omental, perineal, the femoral, etc.; the most common of all is the inguinal, occurring in the groin. It may be direct or internal and oblique or external. When a hernia cannot be reduced, and, above

all, when it becomes strangulated, it is apt to terminate in gangrene and death.

HEROD THE GREAT, King of the Jews, an Idumæan by birth, made king by the triumvirs in 40 B. C. He is famed in history for his cruelty; and one of his latest acts was the massacre of the Innocents, which he ordered in the hope of killing him who (the Magi had told him) was "born king of the Jews." He died in 2 A. D.

HEROD AGRIPPA I., son of Aristobulus by Berenice, daughter of Herod the Great. From his attachment to Caligula he was imprisoned by Tiberius, but on the accession of Caligula (A. D. 37) he received the government of part of Palestine, and latterly all the dominions of Herod the Great. To please the Jews, with whom his rule was very popular, he caused St. James to be put to death, and imprisoned St. Peter. He died in the circumstances related in Acts xii., in A. D. 44.

HEROD AGRIPPA II., a Jewish prince; son of Herod Agrippa I.; born about A. D. 27. On his father's death, he being too young to govern, Judea was reduced to a Roman province. He subsequently received the kingdom of Chalcis, and obtained the superintendency of the temple at Jerusalem, where, with his sister, Berenice, he heard the defense of Paul before Festus. Being driven from Jerusalem by the revolt of the Jews he joined Cestius, and later on Vespasian, and during the siege of Jerusalem was very serviceable to Titus. After its reduction (A. D. 70) he and Berenice returned to Rome. He is supposed to have died there, A. D. 94.

HEROD ANTIPAS, son of Herod the Great, by his fifth wife, Cleopatra, was appointed tetrarch of Galilee on his death (4 B. C.). This was the Herod who put to death St. John the Baptist, in compliment to his wife Herodias in revenge for his reproaches of their incestuous union. Having visited Rome he was accused of having been concerned in the conspiracy of Sejanus, and was stripped of his dominions, and sent (A. D. 39) with his wife into exile at Lugdunum (Lyons), or, as some say, to Spain, where he died.

HERODIAS, a granddaughter of Herod the Great and Mariamne, daughter of Aristobulus and sister of Herod Agrippa I. She was first married to her uncle Herod Philip, but afterward abandoned him and connected herself with his brother Herod Antipas. It was by her artifice that Herod was persuaded to cause to be put to death John the Baptist, who had boldly denounced the incestuous connection which subsisted between her and Herod.

HERODOTUS (-rod'ō-tus), a Greek historian, surnamed "the Father of History"; born in Halicarnassus, Asia Minor, probably about 484 B. C. Disgusted with the government of Lygdamis, the grandson of Artemisia, who was tyrant of his native city, he retired for a time to the island of Samos, whence he acquired the Ionic dialect, in which he afterward composed his history. To collect the necessary materials for his great work, he entered in early manhood on a course of patient and observant travel, visiting almost every part of Greece and its dependencies, and many other countries. On his return from his travels, he took a prominent part in delivering his country from the tyranny of Lygdamis. But the expulsion of the tyrant did not bring tranquillity to Halicarnassus, and Herodotus, having himself become an object of dislike, again quitted his native city, and settled at Thurii, in the S. of Italy, B. C. 443. Here he wrote the work which has immortalized his name. His history consists of nine books, which bear the names of the nine Muses. He died in Thurii, Italy, probably about 424 B. C.

HERON, the common name of birds of the genus *Ardea*, constituting with the bitterns the family *Ardeidæ*, type of what is now commonly regarded as a separate order of birds, the *Herodiones*. The herons are very numerous, and almost universally spread over the globe. They are distinguished by having a long bill cleft beneath the eyes, a compressed body, long slender legs naked above the tarsal joint, three toes in front, the two outer united by a membrane, and by moderate wings. The tail is short, rounded, and composed of 10 or 12 feathers. The common heron (*A. cinerea*) is about three feet in length from the point of the bill to the end of the tail, builds its nest in high trees, many being sometimes on one tree. Its food consists of fish, frogs, mollusks, mice, moles, and similar small animals. The great heron (*A. herodias*) is an inhabitant of America, and is called also great blue heron; the great white heron or egret (*A.* or *Herodias alba*) belongs to Europe; and the green heron (*A. virescens*), the flesh of which is much esteemed, is a native of North America.

HERPES, a skin affection, composed of vesicles grouped on an inflamed surface, as in the lip (*herpes labialis*) in pneumonia, or as shingles (*herpes zoster*) where they form a belt round half the body. Duration, from 16 to 20 days.

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